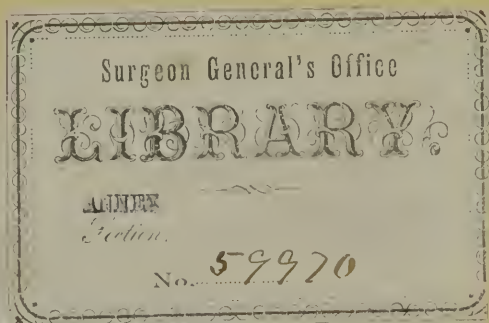


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THE
PRACTICE OF SURGERY.

THE
PRACTICE OF SURGERY:

EMBRACING

MINOR SURGERY

AND

THE APPLICATION OF DRESSINGS,

ETC., ETC., ETC.

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ETC., ETC., ETC.

Venienti occurrere morbo.—PERSIUS.

WITH NUMEROUS ILLUSTRATIONS.



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PREFACE.

It will be seen at once by the more advanced student, that this work does not aspire to supplant any of the numerous and able productions which treat fully and minutely of surgical science; its design is a more humble one.

In this introductory survey of a vast and varied field of knowledge, the author has endeavoured not to confuse his reader with a laborious attempt to embrace each detail of fact and theory; his aim has been rather to point out only the most prominent and distinctive features of a very fertile subject. Under this restricted plan, he hopes that it may serve as a *guide-book* to the *student* and *young practitioner of surgery*.

To those who are investigating some particular subject, this treatise may appear too concise; while others, in search of a more practical and general view, may consider it too extended. To both these classes, the author would say, that his chief endeavour has been to include all that is essential with as much brevity as accuracy and clearness would allow.

It has been urged by some, that many of the practical works of the day savour often of prolixity, and that discussions are introduced which belong rather to the province of strictly theoretical treatises.

The author will be more than compensated for his labours, should it be found that this defect has been avoided, whilst

there is not wanting a reasonable degree of the only merit within the scope of his design, viz. : a careful and sufficiently digested selection, and a clear and exact account of the most important facts and principles already furnished by the ablest observers and practitioners.

In the preparation of this work the following authors have been freely consulted and used, and to them is due, whatever merit may be accorded to the principles and practice advanced in these pages :—Sir Astley Cooper, Sir B. Brodie, Messrs. Miller, Druitt, Fergusson, Lawrence, Drs. Gibson, Pancoast, Carpenter, Dunglison, Prout, MM. Velpeau, Malgaigne, Ricord, Sichel, Weller, Rayer, Guthrie, Hennen, and others.

To these sources the student is earnestly commended whenever time and opportunity is afforded for more extensive professional research.

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PRACTICE OF SURGERY.

FIRST DIVISION.

Inflammation—Mortification—Management of Inflammation—Diagnosis—Erysipelas—Burns and Scalds—Carbuncle, or Anthrax—Boil, or Furunculus—Effects of Cold—Ulcers—Sinus—Abscess—Properties of Pus—Empyema—Hypopion—Arthropuosis—Paronychia, or Whitlow—Wounds, Incised, Contused, Lacerated, Punctured, Penetrating, Poisoned, and Gun-shot—Tetanus.

INFLAMMATION.

INFLAMMATION, *inflammatio*, *phlogosis*, *phlegmasia*, is a disease characterized by heat, pain, redness, and swelling; with or without fever.

Inflammation is essentially a morbid action, and is at variance with healthy function and structure.

It is divided into *acute* and *chronic*, these divisions being based upon the period of its duration.

In the *acute* form, the duration of the inflammation is brief; the action advances with rapidity through its various stages, reaches its climax, and declines with corresponding alacrity.

In the *chronic* form, the action is sluggish; weeks and months are occupied in arriving at the climax, after which its decline is tedious, unsatisfactory, and frequently imperfect.

The two forms may be commingled; the acute may pass into the chronic, by being modified or partially relieved by treatment, chronic inflammation having a subdued character, with moderate action.

The *symptoms* of both these varieties are the same, although those of the chronic are much more mild and less distinctly marked than in the acute form. In acute inflammation, the constitutional symptoms are well-marked depression, coldness, aching

in the loins and limbs, languor, nausea, headache, a small quick pulse, with a general feeling of discomfort.

In inflammatory fever, this condition is followed by rigor or shivering, which is soon succeeded by a sensation of heat of the whole surface, with a full, strong pulse. This is the mark or sign of reaction, and is of great practical importance; it signifies that the system has shaken off the temporary depressing influences which weighed it down, and has roused itself for energetic and powerful action. This is the time, also, for action and energy on the part of medical interference; for this is the tide of inflammatory action, which, if taken at its full flood, as it rolls on with almost irresistible force, is almost sure to lead to a fortunate and decisive issue; but if this crisis be allowed to pass uninterrupted, the inflammation runs its course despite the employment of means and remedies, whose application at the happy moment would have served to avert disaster.

The local symptoms of inflammation are *redness, swelling, heat, and pain*.

Redness.—This is due to the greater amount of blood sent to the part inflamed. Not only are the vessels unusually gorged with blood, but that blood is preternaturally red, much of the liquor sanguinis having moved on from the field of actual or threatened stagnation, leaving the over-distended vessels filled chiefly with an agglomeration of red corpuscles.

The extreme vascularity of certain parts when inflamed, as the conjunctiva, has been supposed to depend in part on the formation of new vessels, which may ultimately be the case, but is not so in the first instance; for minute capillaries, carrying in health the red corpuscles in single files, are invisible to the unassisted eye: inflamed, they dilate, become crowded with corpuscles in mass, and are therefore plainly visible, appearing to have sprung into existence suddenly by a new creation, but in truth are only an enlargement of vessels previously existing. The degree of redness varies according to the intensity of the action and the number of vessels engorged. An inflamed tendon is less florid than inflamed skin, whilst inflamed skin is less red than inflamed mucous membrane.

The tint varies according to the character and accompaniments of the action; *acute* and *sthenic* inflammation is accompanied by a bright arterial red, whilst the *chronic* and *asthenic* is denoted by a dark venous or purple hue. Great attendant biliary derangement gives a yellowish-red colour, as in bilious erysipelas.

It is imagined, also, that during the inflammatory remora of the blood, transudation takes place of the colouring matter from the red corpuscles to the plasma, and also from the general mass of blood through the vascular coats to the parenchyma; to the extent of this occurrence, the variations in the tint of an inflaming part may be, at least in some degree, ascribed.

Swelling.—The simple accumulation of blood in a part will cause more or less swelling; but as a symptom of inflammation, it is mainly caused by escape of a portion of the vascular contents into the intervascular spaces. The action being nascent, serum is effused. In its second stage the liquor sanguinis is found, or fibrin more or less separated from its serum; and this fibrin is of high plasticity. In the third stage the fibrinous deposit is continued, but of impaired plasticity, and with it is mixed blood extravasated entire, the result of vascular lesions; ultimately purulent formation is more or less advanced.

Swelling, like redness, does not alone indicate inflammation; it must be conjoined with other symptoms. It is also of gradual and recent formation, not suddenly developed, like the sanguineous infiltration immediately consequent on a blow, nor of tedious growth and ancient origin, like the genuine tumour.

The tendency of swelling is to relieve the over-distended vessels of a part of their burden; and an opportunity, varying according to the extent and rapidity of the effusion, is thus afforded them of recovering from debility, regaining their normal tone, and once more controlling the circulation of their contents.

Yet swelling may prove in the last degree injurious, by pressing upon important and delicate parts, as the brain. Rapid swelling in a loose texture tends always to relief, as in the ordinary fibro-cellular tissue; while swelling in unyielding parts requires both constant and skilful care to avert injury. Acute effusion upon bone, beneath a tightly spread fascia, or between bone and its

fibrous periosteum, are occurrences invariably severe, and prone to result in destruction of texture. Acute action, with rapid effusion in and beneath the conjunctiva, is comparatively harmless; but if this occur in the cornea, the result is usually gangrene.

Heat.—This may be considered the most important phenomenon of inflammation, and the most difficult to explain satisfactorily; it is never absent, and seldom devoid of prominence where inflammation exists. One great cause of heat in an excited and inflamed part is the rapid flow of an increased quantity of arterial blood to the region or organ affected, the function of which is disturbed: notwithstanding this arterial source of heat in the inflamed locality, which is undoubtedly great, yet the thermometrical measurement gives but very little elevation of temperature, only a few degrees above the natural standard, 107° of Fahrenheit being the maximum; but the amount of the increased temperature received by the part, above its healthy standard, is very great, as shown by the experiments of Dr. Thompson. The arterial or *vital caloric* of the inflamed part is not absorbed, or an accumulative temperature; it is *free caloric*, which is constantly *radiated*. Thus, Dr. Thompson found that a small inflamed spot in his groin radiated, in the course of four days, a quantity of heat, sufficient to have heated seven pints of water from 40° to 212° . The quantity of caloric to which the disordered part is subjected, above the healthy standard, must have a deleterious effect upon texture and function. But the greatest increase of temperature takes place in the animal tissues after *vitality has ceased*, as shown by the experiments of Drs. Davy, Dowler, and others, where the thermometer, placed in the thigh, after the entire departure of animal life, rose to 113° . From this view of the subject, it appears perfectly clear that the greatest elevation of temperature in an inflamed part takes place after the cessation of vitality of such part, and the greatest rise of temperature is due, therefore, to physical changes, and not to vital action; for it has been demonstrated that the highest source of the *vital* power of generating caloric does not exceed 107° , whilst the *physical* power of generating heat rises to 113° . The heat of an inflamed part is, therefore, created in part by vital action through the medium of arterial circulation, but principally

by *molecular death* in the constituents of the blood and tissues; for the moment vitality ceases to exist in the molecules, they become at once amenable to the laws of *physics*, and the generation of the highest temperature in the mass is due to *chemical changes* in its molecular constituents.

Pain.—This is probably the most characteristic symptom of inflammation. It is caused by compression of the nervous filaments, from the effusion and consequent tumefaction of the inflamed part, encroaching upon the nerves, and thus acting mechanically upon them; consequently the pain is increased as the tumefaction advances, particularly if the surrounding tissues be firm and unyielding, as well as at each throbbing impulse of the arteries of the part, the *nervi vasorum* of the distended and elongated arteries adding something also to the general amount of pain. Another fruitful source of pain is from the sentient nerves having their function excited and perverted, and becoming themselves one of the seats of the inflammatory action. Such causes, as well as their results, are liable to vary. The pain caused by inflammation is not uniform; it is influenced by the intensity of the action and the nature of the affected part. Thus, a part naturally sensitive produces more pain when in a state of inflammation than one naturally insensible; therefore inflammation seated in the skin gives more pain than when its seat is cellular tissue. The intensity of pain is in great measure due to the yielding or non-yielding power in the part in which the effusion occurs. Thus, inflammation of bone is more painful than inflammation of skin. Pain, if intense and constant, is formidable in itself, and certain to exhaust the powers of life; it must, therefore, be subdued, at whatever cost. But in the main, the tendency of pain is salutary, unless too severe; for if the action of inflammation were painless, texture, function, and even life might be lost, before either patient or physician was aware of its existence.

Predisposing Causes of Inflammation.—These may either act through the general system, or upon the part itself, or by both these means. *Debility*, general and local, is unquestionably one of the greatest of this class. There is a vital power inherent in the system which resists morbid action, and when actually com-

menced, controls and modifies it. The derangement or depression of this vital power renders the whole system, as well as all its parts, more liable to disease. Thus inflammation itself predisposes to inflammation, as all other causes do which create debility, as bad food, air, and intemperance; excessive and habitual exertion of mind or body, nervous irritability, previous disease, habitual excessive evacuations, increased and continued use of the eye, kidney, liver, &c., by increasing sensibility and causing a determination of blood to the part. Sanguineous congestion, both sthenic or active, which depends upon an increased arterial action and flow of blood to a part, or asthenic or passive, dependent upon debility or want of action in the veins of the part. Thus, the liver and mucous membranes of the alimentary canal are doubly predisposed to inflammation, when exposed to the excessive temperature of a tropical climate.

Exciting causes.—These induce the morbid action, by direct injury or irritation, as wounds, pressure, lodgment of foreign bodies, the application of poisons and other irritants, heat and cold.

Inflammation may occur, however, without any assignable cause; it is then said to be idiopathic or spontaneous.

All parts of the animal economy are liable to inflammation; but the skin, mucous membrane, serous membrane, and cellular membrane, or areolar tissue, are more frequently the seat of this morbid action than the osseous, arterial, venous, nervous, fibrous, and cartilaginous tissues.

Terminations.—Most authors give four terminations to inflammation, viz., adhesion, suppuration, ulceration, and gangrene. Others have added four to the above, as resolution, effusion, granulation, and cicatrization, thus making eight terminations. Several of these are but the products, results, and effects of inflammation,—a fact which is self-evident at the first glance, and not its terminations, but coexist with, and have no being without it.

It appears quite possible to present this subject in a more comprehensive and tangible form; and entertaining such views, it becomes an imperative duty to attempt the task, even though it involve the expression of convictions and views not heretofore generally advanced.

In order to make this clear to the mind, the healthy circulation and composition of the blood must first be comprehended.

COMPOSITION OF HEALTHY BLOOD.

There are four principal components in the blood, namely, *fibrin*, *albumen*, *corpuscles*, and *saline matter*. In the circulating blood they are thus combined :

Fibrin, }
Albumen, } In solution, forming *liquor sanguinis*.
Salts, }

Corpuscles,—suspended in liquor sanguinis.

In coagulated blood they are combined as follows :

Fibrin, }
Corpuscles, } Crassamentum or clot.

Albumen, }
Salts, } Remaining in solution.

The following are the analyses of M. Lecanu, MM. Becquerel and Rodier. M. Lecanu's analyses are from the blood of two healthy men, whilst that of MM. Becquerel and Rodier give the maximum, minimum, and mean of the blood of eleven men.

	M. LECANU.		MM. BECQUEREL AND RODIER.		
	1.	2.	Mean.	Maxima.	Minima.
Water, - - - -	780·2	785·6	779·0	800·0	760·0
Fibrin, - - - -	2·1	3·6	2·2	3·5	1·5
Corpuscles, - - -	133·0	119·6	141·1	152·0	131·0
Albumen, - - - -	66·3	71·5	69·4	73 0	62·0
Extractive matter, salts, } and loss, }	14·6	13·1	6·8	8·0	5·0
Fatty matters, - - -	3·8	6·6	1·5	3·2	1·0
	1000·0	1000·0	1000·0		

It is shown from this table of the composition of the blood, that much the greatest bulk of the fluid consists of water or serum, and that the red corpuscles are more numerous than the colourless corpuscles.

Fibrin is the assimilating principle, that to which the reparative

operations of nature are due; for it is to the *colourless corpuscle*, the *elaborator of plastic fibrin from unorganizable albumen*, to which nature has alone to look for the restoration of lost parts and the reparation of impaired members of her system.

If we view a capillary vessel, the capacity of which (for example) is just sufficient to admit the easy flow of two red corpuscles, and one colourless corpuscle, to pass through in *healthy circulation*, we can go on with this, to parts under *reparative excitement*, in which case there is a slight acceleration of the circulation, and an evident increase in the comparative number of fibrin-cells (colourless corpuscle), or plastic elaborating material of the blood; which in this healthy state of excitement, deposits fibrin by the *exudation-corpuscles* formed in the transuded liquor sanguinis; the fibrin assimilates with the surrounding tissue, becomes organized, and forms part of it. Thus it is that nature quickly repairs the tissues, whose continuity is destroyed by external violence, or affected by inflammation. Reparative excitement is very different from inflammation; for in the first we see merely increased exertion on the part of nature, with the necessary accumulation of plastic, assimilating material, required for the repair of the injured part; every molecule and tissue is here in a living and healthy state, with the circulation unobstructed, and the consequence is the healing of wounds by the first intention, and the repair of parts through the medium of granulations, which have been destroyed by inflammation.

In this newly deposited living and healthy fibrin-molecule, or primordial cell, there is a natural law of transformation imposed, which causes it to assume the properties and functions of the original tissue to whose aid it is sent, and through this unknown law becomes an integral and perfect part of its structure.

By a continuance of the excitement or irritation, from whatever cause it may have been produced, the flow of blood through the vessel is still more accelerated, the red corpuscles are crowded together, whilst the increase in the colourless corpuscles is in direct ratio to the excitement; the capillaries become distended, and many begin to carry numerous red corpuscles, which before admitted but one. These soon become clogged by the number of corpuscles and fibrin-cells forced into them by vis a tergo; the circulation in

consequence *becomes slow and retarded*. With the aid of the microscope, this is very observable in the web of the frog's foot, when touched with aqua ammonia. The distended capillaries, in this state of sthenic congestion, relieve themselves by exosmosis, or transudation of the liquor sanguinis into the surrounding cellular tissue; tumefaction is the consequence, whilst the heat of the part is elevated by the increased rapidity of the circulation, and the quantity of arterial blood carried to it. Pain is induced in this tumefied condition of the part by compression of the nervous filaments; it throbs violently, and at each pulsation the pain is necessarily increased in proportion to the unyielding nature of the tumefied tissue. The increased force and activity of the circulation in an irritated or injured part, is a wise institution of nature, to continue the circulation of blood through it, and thereby prevent stagnation and destruction of the tissues; for it is evident that an increased propelling power is necessary to force the fluid through capillaries encroached upon by pressure from without, owing to the effusion into the surrounding cellular tissue, or from any other cause. Thus nature labours to continue circulation of healthy blood through the disturbed part: if she succeed, all goes well, and inflammation is successfully combated; but if her exertions unfortunately should be unavailing, notwithstanding her violent heaving and throbbing efforts, as observed in the excited, distended vessels, in the neighbourhood of the disturbed locality, then it is evident that this very provision of nature to prevent this remora, or stagnation in the capillaries of the irritated tissue, if unequal to the task, must prove of immense injury, by adding to the congestion, causing greater effusion into the interstitial spaces, and even rupture of the distended capillaries, and escape of the blood entire; thus giving rise to *active ecchymosis*. There is also *passive ecchymosis*, which is caused by the breaking down of the coats of the capillaries, by disease or mortification.

We may now have *complete arrest of the circulation* in the centre of the excited part, which may be but a point, or may extend over a large surface; there is now inflammation of the affected tissues, and gradually approaching death of the effused fibrin and other constituents of the blood; if, however, the parts

be speedily relieved, and the circulation re-established, we have then a return to the natural healthy condition of the parts; circulation goes on through the tissue, and *resolution*, or the termination of the threatened inflammation is the happy consequence.

If we have, instead of this, a continuance of the stagnation, the vitality, of the now truly inflamed tissues, is entirely lost, and they pass beyond the boundaries of the legislation of vital laws, at once into the territory of physical government, and henceforward their relations to the living system are entirely altered; they have now become effete or foreign bodies, and the laws of the economy require that they shall be thrown off, or cast out. In the present instance, where all circulation has ceased and inflammation established, from whatever cause, there is increased heat in the surrounding parts, as previously explained, from accelerated circulation; but it is probable that the heat in the inflamed spot, where the circulation has entirely ceased, and the constituents of the blood effused into the interstitial spaces have lost their vitality, (as well also as the parenchyma of the inflamed organs,) that the heat is greater where the vitality is entirely lost, for the component particles of the part have passed from the government of vitality to those of physical principles, and the heat is owing to chemical changes, it is therefore elevated to a higher degree than can be acquired by vital action. The experiments of Drs. Davy and Dowler, as before stated, prove this conclusively, for they found an elevation of temperature in human bodies hours after life had ceased. Where the inflammation causes but the death of the constituents of the effused blood, here we have simply suppuration, for pus is probably nothing but dead red corpuscles and exudation-corpuscles floating in an altered serum, which holds in solution other ingredients of the blood. When the inflammation extends to the soft parts, causing ulceration, or death of the dermoid, muscular, and other tissues, loss of structure is the consequence; for in their transit from vital to physical laws, these solids are converted principally into gases and liquids, and thus pass off, leaving deep cavities: when this change from loss of vitality to physical conditions occurs in the parenchyma of organs, and the surrounding soft tissues, we have extensive slough-

ing ; when seated in the osseous tissue, there is caries, or necrosis of bone.

There is a wise provision of nature, which retards or entirely arrests the process of absorption, during the existence of great excitement, or inflammation of parts of the animal economy. If this were not the case, then would we have the products of inflammation, all of which become foreign and effete bodies, carried directly into the circulation, and thus have the general system implicated in every local inflammation, and frequently destroyed by conveying its products into the circulation. We do not find, therefore, that absorption goes on until inflammation has ceased ; and it is even retarded during the existence of reparative excitement. Therefore the following conclusions may be arrived at. That in healthy circulation there is a perfect balance between assimilation or nutrition, and absorption or removal of broken-down and exhausted matter. But when there is a degree of excitement in a part, caused either by wounds, or nature's demand for reparation of lost tissue ; then her laws have settled that in such healthy excitement, there shall be an increase of plastic material generated and thrown into the circulation, conveyed to where its presence is needed and there deposited ; this reparative excitement is a necessary action on the part of nature, and is perfectly consistent with health ; by this process all repairs of the system are effected, from a natural law of transformation of the assimilating fibrin to the assumption of the functions of the tissue to which it is sent. It is this process which takes place in exostosis, hypertrophy, and simple healthy tumours : these exuberant growths, though healthy in themselves, yet sometimes occasion inconvenience and difficulty, and they are not removed unless the degree of reparative excitement which causes the deposit, (which is the perversion in this instance of one of nature's wisest laws,) be arrested ; for the activity of absorption has been shown to be in direct ratio with the healthy condition of the tissues ; absorption, therefore, is most active in its operations, when all excitement has ceased.

When living fibrin is deposited in large quantity upon the surface, or in the interstices of parts to be repaired, vessels are soon

observed to form in this newly deposited fibrin; at first by an oscillatory movement among its molecules, which then range themselves so as to form regular canals; thus circulation and fully organized life is infused into it: wounds are thus united by the first intention, as surgeons term it, and granulations are formed to fill up the excavations effected by the ravages of diseased action.

Inflammation in its proper acceptation does not exist until the circulation is entirely arrested in the disordered part: there is then, if the circulation be not speedily re-established and resolution procured, either transudation by exosmosis of the liquor sanguinis, or effusion of the sanguineous fluid entire, by the rupture of the capillaries; and the death of this liquid, as well sometimes of all the tissues implicated, may be the result, or the inflammation may terminate solely by the death of the effused constituents of the blood; when suppuration, or abscess, will be the evident result.

It is thus that nature endeavours to relieve herself, when overtaxed, or when her functions are interfered with; for the functions of all the organs of the system are embarrassed, or entirely interrupted, by capillary congestion, or stagnation and consequent inflammation; therefore, nature endeavours by transudation through the coats of the capillary vessels, or even by their rupture, to free herself, and allow the natural and healthy functions of the affected tissues to resume their proper duties; if this transudation or effusion by rupture occur externally, or from a surface leading to a passage or means of escape externally, she often succeeds by these means; but if this extravasation or transudation take place internally, or where escape of the fluid is not practicable, which is often the case, then much harm may be done, and even a fatal result be the consequence.

MORTIFICATION.

Mortification is derived from *mors*, death, and *fio*, to become, and signifies the death of a part, caused either by inflammation, or deficiency of power, or both. It is divided into *gangrene*, and

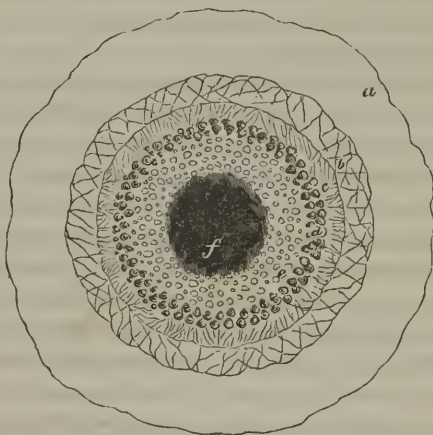
sphacelus. *Gangrene* signifies the process of dying, and is characterized by the part assuming a livid hue, all pain suddenly ceasing, with an abatement of the swelling. *Sphacelus* signifies complete death, and may be recognised by the part becoming cold, insensible, shrunken, and flaccid; the greater part of its substance being resolved into liquid and gaseous matter, the result of chemical changes.

Constitutional Symptoms of Mortification.—Whilst there is inflammation still existing, the constitutional symptoms are those of inflammatory fever; but almost the moment gangrene has commenced, the system passes into the typhoid type of constitutional irritation; the pulse is increased in frequency, but much diminished in force and volume, it is irregular or intermitting, the features are pinched up, the expression of countenance anxious, the mind is affected, there is hiccup, loss of appetite and debility. Some or all of these symptoms are observed in cases of extensive mortification. When the mortified part is small, or is situated in the cellular tissue, it is called a slough; in these cases the constitution is but little, if at all affected.

When internal parts are affected by acute inflammation, mortification may result; the signs which indicate this internal mortification are the sudden cessation of pain, hiccup, loss of appetite, prostration, clammy sweat, and collapsing features.

Mortification, *mortificatio*, should not be restricted in its meaning to the death of several structures, or a large portion of the system, which is generally the case, for it evidently expresses the loss of vitality of a molecule, as distinctly as it does the death of an entire limb or organ: the term mortification may signify molecular loss of vitality, or the death of a whole structure; the action is the same, differing merely in extent. Thus, suppuration is as clearly the effect of mortification, as is the extensive sloughing of cellular tissue, or the destruction of any member of the body by the same action; for the case of simple suppuration is dependent upon the death, or (to employ an analogous term) mortification of the constituents of the blood, producing by this means pus, which is the passage of those said constituents from the action of vital laws to those of physical or chemical action: the production of a slough

is caused by an identical change, and the mortification of an entire limb does not differ in the laws which govern the first and simplest case; it merely involves other parts, systems, and tissues of the economy, being more extended or wide-spread. Thus the death simply of the molecule in the blood, and the consequent formation of pus, strikingly resembles the crumbling cement of a stately edifice; whilst mortification to the extent of sloughing, or ulceration of cellular tissue, parenchyma, dermoid, or muscular tissue, the destruction of brick by brick, or the removal of one stone after another, until its beauty is destroyed, and the hand of dilapidation, by these slow, corroding means, has removed and broken down great masses: but when the mortification or destruction is more widely spread, involving an entire and important member, then, by one mighty and overwhelming effort, is the whole edifice torn asunder, in an instant destroying in mass that which, by slower but equally certain decay, might have occupied years. It is



HORIZONTAL SECTION OF A PART MORTIFIED.

- f.* Slough, or mortified tissue.
- e.* Pus.
- d.* Granulations, or reparative surface.
- c.* Circumscribing fibrinous septum.
- b.* Effused serum in cellular tissue.
- a.* Unaltered healthy structure.

even so with mortification, from its first to its last and greatest step, from suppuration to the death of a limb, differing in nothing save the extent of material involved in the process of destruction.

In mortification, or death of a part, there is probably every variety of action in operation at the same moment : if we take a case of inflammation resulting in the death of parenchyma, or areolar tissue, as in furunculus or boil, then we have, in concentric circles, all the various stages and effects of inflammation and reparative excitement, passing from complete mortification of the tissue to its healthy condition.

This is wisely ordered by nature ; for, wherever the healthy and natural balance of her system is deranged or interrupted, she makes the greatest possible efforts to correct the evil, and to prevent its extension : thus, externally, where there is least resistance, aided by the absorption and destruction of the superincumbent structures, dead matter escapes from the system, and healthy productions repair the loss occasioned by disease : in this manner nature relieves herself of that which, by disease or death, has become foreign to her ; whilst she adopts a simple and perfect method of preventing the extension of the mischief, by the deposit of fibrin under the state of reparative excitement with which she has surrounded the diseased region.

Precisely the same arrangement of the various grades of action is observed in the complete mortification of a whole limb, as in every operation of nature where inflammation invades the system : we find in the case of mortification of the foot and ankle, for example, the same gradation from death to healthy structure. In cases where inflammation effects molecular death, or mortification of the constituents of the blood, if it be upon an external surface, we have ulceration and suppuration ; granulations next in order ; the fibrinous septum ; effused serum, and healthy structure : if, however, we have the pus confined in a cavity in the substance of the soft parts, it then forms an abscess, and the surrounding parts bear the same relation to it that they do to the external suppurating surface.

Thus, at the same moment, by this simple process, producing new granulations, and forming a fibrous sac or boundary to limit

and confine the diseased action, by making this fibrous boundary little susceptible to diseased action: certainly nothing could be more perfect and beautiful than this natural system of reparation and protection.

Inflammation is, therefore, clearly an abnormal action of the system, creating altered nutrition, retarding absorption, and causing mortification of the tissues and loss of vitality in the components of the blood; in other words, causing molecular transit from the influence of vital action to the government of physical or chemical laws.

The dermoid tissue, mucous membrane, areolar tissue, and serous membrane, are the tissues of the system most liable to the invasion of inflammation. Tendon, fibrous membrane, cartilage, nervous tissue, blood-vessels, and osseous tissue, resist the inflammatory process much more than the foregoing tissues; indeed, cartilage and fibrous tissue are very little susceptible to its action.

MANAGEMENT OF INFLAMMATION.

General Treatment.—Removal of the cause should be the first, as it is the indispensable step in the cure, and without which the unceasing employment of the most powerful means will prove abortive.

Blood-letting.—General blood-letting is not invariably necessary; it is a spoliative remedy, and should never be employed except in cases imperatively demanding it: yet, when the nature of the case plainly calls for its performance, it should be resorted to without hesitation; but when employed, the idea of amount should be eschewed, the desired effect should alone occupy the mind, which should be obtained in all cases, whether the amount necessary to this end be large or small. Inflammation, particularly the acute form, engenders great tolerance of depletion: this varies according to sex, age, and temperament, *cæteris paribus*, it is greater in the male than female, and in adult age than either extreme of life; it is greater in the sanguineous than nervous temperament. Similar tolerance, also, of appropriate remedies seems

often generated by abnormal action ; for example, the tolerance of the system for opium in delirium tremens.

Effects of General Blood-letting.—The first effect produced is sedation of the general circulatory system, of the heart's action, as well that of the arterial trunks. Secondly, a diminution in the volume of the blood, and that of correcting a disposition to determination to any one part. Thirdly, by effecting a beneficial change in the component parts of the blood. Fourthly, by the important action or derivation of the blood from the affected parts : thus, when an inflamed spot is placed in the field of the microscope, and blood is drawn from a distant part, the blood in the inflamed part is observed to travel off to fill up the deficiency elsewhere ; even stagnant portions resume their lost movements, and pass rapidly to the relief of the distantly depleted parts, thereby arresting the inflammation which was upon the very eve of breaking forth with destructive violence, which nothing could have prevented save the re-establishment of the capillary circulation. Fifthly, by decreasing the morbid impetus of the blood, thereby facilitating the beneficial action of other remedies, as mercury and opium, which, without blood-letting, in cases calling for depletion, would either prove positively injurious, or fail in the production of any beneficial effect.

Reaction.—After a full bleeding, the circulatory system may, sooner or later, rouse its depressed powers : if the inflammation be removed, it remains subdued and quiet ; but the reaction may even be excessive. This is dependent upon two causes, one of which is asthenic, and arises from general nervous excitement, recognised by a quick, jerking, soft pulse ; headache, oppressed breathing, and nervous excitement. Therefore, in asthenic reaction, to bleed again would only be to add to the already disordered state of the system. A full opiate is the proper remedy ; sleep follows, and the excitement is subdued. When the reaction is of a sthenic character, then there is a different state of things existing : here we have a continuance or reaccession of the inflammation ; the pulse is hard, and possesses all the characters which distinguished it previous to depletion ; local pain and heat are unconquered, and the inflammatory character of the fever remains unaltered.

Sthenic reaction should be met promptly and boldly by the lancet, and that, too, at once; the importance of time is paramount in this state of the case, for that which is equal to the cure if employed at the instant, when delayed, becomes inert, if not injurious; therefore, blood-letting, to prove beneficial, like all other remedies, must be applied precisely at the right time, a rule of action that depends upon sound medical judgment. “Obsta principiis.”

Local Bleeding.—This is often employed in conjunction with general bleeding, to relieve a part, as well as the general system, and operates beneficially upon both; for whilst it relieves local congestion, it also continues the sedative effect of the general system. There are circumstances which render it preferable to, and a substitute for, general bleeding,—as slight cases of inflammation when seated in an unimportant part, in old age, and in childhood. When only a small amount of blood is to be drawn by leeches or other local means, it should be taken from a part removed from the seat of inflammation; otherwise, if placed immediately upon the part, they would only increase the congestion by draining blood from the surrounding parts to the point of inflammation. Therefore, M. Lisfranc wisely recommends, when blood is taken from an inflamed surface or part, it should be drawn in large quantities; the object is, to entirely drain the engorged vessels of the inflamed region, and deplete the surrounding structure also, producing a strong antiphlogistic derivation.

The modes by which local depletion is effected are various: as cupping, leeching, incision, scarification, and puncture.

Cupping, should be employed when the object is to draw a large quantity of blood suddenly from the part, or when it appears the best adapted to the case in question.

Leeching can be employed where cups cannot be applied. Leeches should not be applied in females where the cicatrices would be unsightly. In children, large superficial veins should be avoided; nor should they be placed on the eyelids, since in this situation they are apt to cause acute œdema and ecchymosis in the part; nor where cutaneous nerves abound, as erysipelas is apt to follow; they should not be applied directly to the inflamed part,

for the reason that the stimulus of their bites add to the existing inflammation; nor should they be applied near an acute ulcer, for their bites are apt to degenerate in this case into ulcers; if the ulcer be of specific character, the bites become inoculated, and thus extend instead of decreasing the ulcerated surface; neither should they be placed where bandages are of paramount importance, as in fractures, for in such cases the bites are apt to inflame and ulcerate, and thus cause the removal of the apparatus at a critical period.

Local depletion may often be advantageously effected by means of *punctures*, as in erysipelas; by *scarification*, as in inflammation of the mucous membrane; by *incision*, as in phlegmonous erysipelas. These wounds perform their most important effects by relieving the parts affected of the serous, fibrinous, and purulent effusions, as well as by affording a ready means of external escape to the succeeding effusions.

Purgatives disburden the alimentary canal, and correct one of the most prominent symptoms of inflammation—constipation. They deplete by increase of mucous exhalation and serous discharge from the bowels. Their derivant effect is great, from their counter-irritant action in causing an increased flow of blood to the intestinal canal, and are especially derivant from the brain. For the same reason that they are beneficial in affections of the brain, they are injurious in inflammation of the bowels.

Emetics are useful in evacuating the stomach, increasing secretion from the liver, and disgorging it by compression, by favouring perspiration and expectoration.

Mercury is useful as a purgative, by increasing the secretion and promoting the flow of bile. It is not as a purgative that mercury is principally antiphlogistic, but more especially from its diffusible power through the medium of constitutional effect. When the system is under the influence of mercury, it has the valuable effect of subduing capillary inflammation, and at the same time arresting the deposit of fibrin and promoting the absorption of the effused matters; for the activity of the absorbents returns with the decline of inflammation, and thus when secretion or deposit is least active, absorption is most so, “et vice versâ.” Mercury is also

supposed to act directly on the blood, affecting the red corpuscles, and assists in the removal of an abnormal proportion of its fibrin. From this view of its action, it can readily be seen that it is a remedy in many cases of the highest degree of usefulness; notwithstanding this, it should not be used rashly and to excess; for when employed thus, its effects are most permanent and deleterious to the system. When the constitutional effect of mercury is desired, it should be combined with opium, to prevent its passing off as a purge, and to retain it in the alimentary canal for absorption. Mercury, it should be remembered, is but subsidiary to blood-letting as an antiphlogistic, and unless the intensity of vascular action be first broken by depletion, mercury fails to have its beneficial effects, and disappointment and defeat are the consequences. For internal use, calomel is generally preferable; for external employment, mercurial ointment.

Opium is a valuable auxiliary to depletion, but if given before instead of after blood-letting, it stimulates, and thus adds to the mischief; whereas, if it follow venesection, its effect is decidedly sedative, both upon the circulatory and nervous systems, and modifies the reaction following the free use of the lancet. Narcotism, however, should be avoided; when opium is used with the object of sedation, its effects must be carefully watched, bearing in mind the various quantities necessary to produce the same effect in different cases, owing to the degree of *tolerance* induced by the diseased action upon the system; if it be combined with mercury, antimony, or ipecacuanha, the tendency it possesses of opposing secretion, is corrected. Two of its most useful properties are its power to allay pain and nervous irritability.

Antimony.—The Antimonii et Potassæ Tartras, Tartar Emetic, is the preparation mostly employed; this is, beyond doubt, one of the most valuable antiphlogistic medicines we possess; unlike the previous remedies treated of, depletion is not necessary to its full effect; but, on the contrary, in many cases it is calculated to supersede the use of the lancet; combining the power of affecting the general system by sedative nervous action, and commanding to a wonderful degree the action of the sanguineous system: thus, in pneumonia, many depend entirely upon the antiphlogistic action of

antimony to effect the cure, and it is generally equal to the task ; still, when preceded by early and careful depletion, the result becomes more certain. Antimony, like mercury, has the valuable property of arresting capillary inflammation, thereby restoring the stagnated circulation and producing resolution ; thus, by the same curative action of capillary inflammation, correcting effusion, and exudation, or deposit of fibrin, and necessarily restoring the full vigour of the absorbent vessels. In one respect it differs from mercury in an essential point, which is of great practical importance : this is the momentary influence of its action, which does not endure long after the administration of the remedy ; its effects are transient, whilst those of mercury are persistent, and continue to operate long after the administration of the remedy has ceased ; these points of difference in two of the most important remedies of the *materia medica*, (with which, opium added, almost all the indications of disease may be met,) are most desirable to comprehend, since they point out which of the two peculiar varieties of action is applicable to the case under treatment. This difference is so striking, that notwithstanding the apparent identity of action, the contrast is sufficient to preclude the substitution of one for the other ; hence a certain degree of discrimination is imposed upon the practitioner, in his choice between these two agents. In small doses, antimony is highly *diaphoretic*, in large doses, *emetic* and *sedative*, producing prostration and great relaxation of the system, valuable properties in dislocations ; it possesses also *diuretic* and *purgative* effects, and has the power of exciting the secretions generally. This remedy must be employed with some care, for it is or may be made an irritant poison, by over taxing the stomach. Antimony may often be advantageously combined with opium.

Aconite and *Belladonna*, from their sedative influences, as well as their anodyne properties, are useful antiphlogistics in certain cases : as the inflammatory stage of erysipelas, inflammation, rheumatism, &c. They should be employed with care, however, and given in small doses, and their effects closely watched on account of the peculiar action they possess of depressing the vital powers to a dangerous degree.

Colchicum is antiphlogistic in its action, by increasing the secretions of the liver, kidneys, and mucous membrane of the intestinal canal; it is considered peculiarly adapted to the correction of the inflammatory action of rheumatism.

Rest may be said to be indispensable in the management of inflammation, whether it is general, local, or organic. In most cases, entire rest should be insisted upon, and where it is possible, functional rest should be procured, and maintained as much as possible until inflammation is entirely arrested.

Diet.—This is one of the most powerful antiphlogistic means. In speaking thus, reference is made rather to the absence of almost everything under the name of diet; for the system, during the continuance of active inflammation, requires no support, as a general rule, from dietetic articles. Entire rest of the complicated and exciting digestive functions, is its only requirement. Support from food is not needed, nor should it ever be forced upon the disordered system; therefore, one of the most important steps in the cure of inflammatory affections, is abstinence from food of every description; there is no fear of seriously injuring any system by one week's starvation; and there are few cases of acute inflammatory action that cannot be conquered in this time. Where it is advisable to allow a moderate diet, it should consist in small quantities of articles of the most simple and unstimulating nature. This does not apply to cases entirely convalescent, nor to those that are sinking, for in these the most nutritious, and frequently stimulating articles, are called for, and should be administered. But in the management of inflammatory action, the importance of these principles is too often overlooked.

LOCAL TREATMENT.

Rest of the inflamed locality, if possible, should be absolute; where the mischief is seated in the muscles, they should be placed in such a position as to relax them entirely.

Position is all important in the management of local inflammation; the physical law of gravitation acting upon fluids is here

usefully applied, in the practical management of disease. The inflamed part should, therefore, be placed in such position, that gravitation will act as a sanguineous drain, and at the same time oppose injection of the inflamed part: for these reasons the advantages to be derived from it should never be neglected.

Cold should be considered, and employed rather as a preventive or prophylactic to inflammation, than as a means of its cure; therefore, the employment of cold is invaluable during the period of incubation: for instance, in cases of incised wounds, where it is desirable to prevent the establishment of inflammation, a reparative excitement being alone required, cold should be applied to subdue the excess of action likely to supervene in such cases. When the remedy has succeeded in averting the inflammatory process, it should be gradually withdrawn by increasing the temperature of the application until it reaches the natural healthy standard; then it should be discontinued. If its application fail in preventing the establishment of inflammation, then it should be gradually withdrawn, as already recommended, but in this case carried to a higher temperature; for cold, by exciting contraction of the parenchyma, renders the tissues less yielding, and consequently increases tension, and opposes exudation, or effusion, one of nature's means of relieving turgescence, congestion, and stagnation of the capillary system, thereby enabling the vis a tergo of the increased arterial action to continue circulation through the part, and thus prevent the advent of inflammation: it is evident also that after inflammation has occurred, the continuance of cold is injudicious, and should be laid aside by gradually increasing the temperature; the object being to pass from the application of cold, to that of heat and moisture. Ice is frequently employed to produce cold; care should be taken not to apply it directly to the part, for if kept there a great length of time the part will be frozen, and when removed it will be found that the application instead of combating, has produced inflammation: another point of interest, is the necessity for the constant application of cold, after it is once begun; for if it be removed for a time, reaction is the natural consequence, and this reaction taking place in a part labouring under excitement scarcely below inflammatory action,

passes of necessity, by this accession of force, aided by the injudicious management of remedial means, at once to inflammation: therefore, it is more judicious to apply cold, either by means of ice water, refrigerating fluids, or evaporating lotions, by a syphon-like arrangement, leading from the basin or vessel containing the cold fluid; a piece of lint, one end of which rests in the fluid, whilst the other is placed upon the cloth covering the inflamed part; by this simple, but effectual means, the part is kept constantly cold, the fluid being conveyed to it along the lint by capillary attraction.

Heat and Moisture should never be employed until inflammation has undoubtedly set in, but after this is the case, then the very reasons urged against their application during mere excitement, are now the most potent for their employment; these are their powers of producing relaxation and distension of the parenchyma and turgid vascular trunks, and by favouring or causing copious effusion; in this manner relieving the vessels, and freeing the stagnated fluid, circulation is resumed and resolution procured; pain and heat of the part is abated or entirely relieved by the same action. It can readily be seen from the effects produced by heat and moisture, that whilst they are so beneficial during the inflammatory stage; the same action which makes them so must plainly render them improper applications the moment that the inflammatory stage has ceased, and inflammation no longer resides in the part; therefore they should be withdrawn the moment they have performed their task, and the application of means which give tone and promote contraction substituted: here again cold is indicated, or what is better, simply protecting the part from external injury and allowing nature unassisted to work her own salvation, which she always does far better than by the aid of art. Heat and moisture are applied either by *vapour*, *hot-water*, or *poultice*.

Nitrate of Silver is decidedly antiphlogistic when applied to a surface, but its influence probably does not extend beyond the dermoid tissue, or surface to which it is applied; when applied to a part exposed to the atmosphere, it first appears white, but soon turns black, this blackness does not extend deeper than the epider-

mis, which desquamates in the course of a few days : when applied to the mucous membrane of the mouth or throat, either in solution or solid form, it exerts an excellent and highly antiphlogistic effect. It is therefore only applicable to superficial inflammation, as erysipelas, erythema, chancre, &c.

Iodine, like nitraté of silver, is applicable to superficial inflammation ; in its employment the tincture should be freely pencilled over the inflamed part. It is a useful application in cases of inflammation and enlargement of superficial lymphatic glands, as well as where the cellular tissue is loose and flabby, and liable to great distension by effusion, as the eyelids and prepuce.

Pressure is generally considered useful at the commencement of inflammation. But its antiphlogistic action is exceedingly doubtful, and if at all useful, it can probably only prove so as a prophylactic.

Counter-irritation is one of the most valuable means of relieving local inflammation ; it proves so from its active derivant effect, by creating an acute inflammation in a distant sound part, by artificial means, which can readily be subdued when the object is effected for which it was created. The position selected for the operation of this action is important, for if it be applied to the part inflamed or even too near, it attracts the circulation and adds to the existing harm : again, if its application be too far removed, its effect may be expended before reaching the deranged locality ; therefore, care should be used not to apply it too near, nor yet too far from the seat of inflammation.

The modes and means of applying counter-irritation are various ; *rubefacients* are the mildest of these means ; they consist in *mustard*, *gentle heat*, *stimulating embrocations*, *dry cupping*, &c.

The more energetic modes of applying counter-irritation, consist in the various *vesicants*, as cantharides, intense heat, the acids, concentrated aqua ammonia, boiling water, tartar emetic in strong solution or ointment, croton oil, the seton, issue, moxa, and the actual cautery.

The proper management of these means, will be treated of in the cases to which their application may be appropriate.

DIAGNOSIS.

Before entering upon the consideration of special injuries and diseases, it may be useful to say a word upon the importance of correct diagnosis; because the subject is too much neglected in this country. In this department of medicine and surgery, we are far inferior to the French, who are probably the best diagnosticians in the world. A correct diagnosis is undoubtedly, in most cases, the greater part of the cure, and it is to this fact, that the success of one practitioner and failure of another is mainly due; for if the mind have a clear knowledge of the exact state of the case, the means of cure suggest themselves at once, and rapid success is the result: but on the contrary, let the mind be uncertain and obscured, or ignorant of the condition of the altered system, part, or organ, and what will be the result? What too often happens; disappointment, defeat, and empiricism. Diagnosis is, therefore, a matter of the highest possible importance in a medical education, and nothing should be left undone to complete this branch of knowledge, which is indispensable to success. It is necessary to have a thorough knowledge of all the collateral branches of medicine, and to possess or cultivate a habit of close observation, to make a good diagnostician: in surgery an accurate knowledge of surgical anatomy is indispensable. Two of the most important points in making a diagnosis are, ample time, and thorough examination: nothing is more important in arriving at correct conclusions, than these apparently simple rules; therefore, care should be taken to prevent the mind jumping at conclusions from insufficient data: diagnosis should be the slow or hesitating part of the management of the case, in which nothing should be despised that has the most remote bearing upon the subject; but after the mind is convinced of the state of the case, then promptness, energy, and boldness, in the application of the means necessary to relieve it, are as admirable and useful, as they are censurable and injurious if employed in ignorance of the precise condition of the system. Urging caution in this preliminary step,

suggests another source of failure to the young practitioner :— this is the too common neglect of practising operations upon the dead subject, and frequent application of bandages and every variety of surgical apparatus. It is impossible to be even a tolerably good surgeon without both these arts, and there can be nearly the same skill and facility acquired in operating by these means, as by the treatment of actual cases, and were this resource faithfully embraced, the new graduate would proceed to the treatment of his first case with actual experience, and perfect knowledge of its proper practical management.

ERYSIPELAS.

Erysipelas is a peculiar inflammation, generally confined to the skin, erratic in character, and subject to metastasis to internal organs ; it is also liable to attack the subcutaneous and muscular cellular tissue, and gangrene is often the result when this is its seat : generally, however, it is seated in the skin, and mostly about the head and scalp.

The *causes* of erysipelas are both general and local ; as constitutional irritability, derangement of the digestive organs, violent passions, wounds, poisons, and leech-bites. After having once suffered from it, the system is more liable to its invasion.

Diagnosis.—The symptoms of erysipelas, when of mild form, are languor, loss of appetite, and nausea. In severe cases these symptoms are felt to a greater degree, with headache, debility, and vomiting, a couple of days before the disease appears externally. The erythema appears on the second or third day, with perspiration and abatement of the early symptoms ; the skin is elevated, of a bright scarlet colour, which becomes white upon pressure, but returns to its scarlet hue the moment the pressure is removed ; there is a burning or itching pain, and the skin has a shining appearance ; small vesicles generally form, containing a yellowish fluid ; these dry and fall off. The early symptoms abate with the appearance of the erythema, which increases for three or four days ; the cuticle gradually turns yellowish, becomes dry, and desquamates, whether complete vesications have been formed or not.

The violence of the constitutional disturbance is in direct ratio to the force of the attack ; in mild cases there is but little derangement.

Treatment.—In mild cases little more is necessary than purgatives, with evaporating or cooling lotions to the part. The disease terminates in about a week.

In the severer forms of the disease, more decided treatment is demanded. Where there is much constitutional disturbance, with fever, general depletion should be resorted to, with active mercurial and saline purgatives, if the system be sufficiently robust to bear this depletion : but this is not always the case in persons subject to erysipelas ; on the contrary, it is frequently necessary to support them by generous diet. Leeches should never be applied to patients labouring under this disease, as their bites are apt, in such cases, to give rise to it in the spot where they are applied. There are many substances which can be usefully applied to the skin. Dr. Gibson recommends British oil very highly as an external application to allay the painful itching of the part. The application of mercurial ointment, nitrate of silver, tincture of iodine, and blisters, are all useful in various cases.

A beneficial mode of treatment in this disease is the internal use of flowers of sulphur and cream of tartar, mixed in equal parts ; a table-spoonful to be taken several times a day, sufficient to keep the bowels gently moved, and at night gr. xii. of Dover's powder, as long as the disease continues ; at the same time employing the following application to the skin five or six times a day, viz. :—Liquor Soda Chlorinatæ ℥ij ; Tincture Aconiti ℥ij ; Aqua ℥vj. Misce.

In cases where there is much tumefaction and high grade of inflammation, Mr. Liston recommends, as being almost universally successful, long and deep incisions in the part, either with the knife or lancet. The incisions should divide freely the skin and subcutaneous cellular tissue, so as to relieve the part from the serous effusion, and to disgorge the over-distended vessels. The part is then to be fomented with chamomile flowers, every hour or half hour, several times a day.

The ordinary cases of erysipelas met with are not difficult to

manage, as a general rule ; but great care is always necessary in its treatment, and the effects of external irritants should be watched closely, since they sometimes cause the translation of the inflammation to some important internal organ. Where this is the case, blisters should be applied immediately to its original seat, and every effort made to recall it ; even the actual cautery should be resorted to in some cases, in order to attract it to some less dangerous position.

Erysipelatous inflammation has great tendency to extend itself over the dermoid surface, and there is no application more useful in arresting this inflammation in its early stages than the free use of a concentrated solution or stick of nitrate of silver, applied to the whole inflamed surface, and extending about an inch upon the sound skin.

Linear blisters have been recommended for the purpose of circumscribing this inflammation. They should be applied one or two inches from the border of the inflamed part, surrounding it entirely ; the inflammation soon reaches these vesicated lines, and is often arrested.

BURNS AND SCALDS.

Burns and *Scalds* are always troublesome to manage, unless they cover but a small surface, and that merely to the extent of vesication. But when the surface of the body is burned to any great extent, they are both dangerous and troublesome.

Burns, agreeably to Pearson, are divided into three degrees ; the least extensive being that wherein the cuticle is not destroyed, nor does vesication always occur.

A greater degree of intensity forms the second division. In this case the cutis is greatly injured, serous effusion follows, and a suppurating and painful ulcer is left by the separation of the cuticle.

The last and greatest degree of intensity is when the entire dermoid tissue and surrounding parts are destroyed, and form a hard eschar.

Diagnosis.—The symptoms in the first degree are not of much

consequence; but in the second and third they become very important. The second degree is frequently accompanied with rigor, a small quick pulse, followed by difficulty of breathing and a hot skin.

In the third degree, the constitutional symptoms become matters of great importance. In this case the shock may be so great that the patient will sink under it. Violent constitutional irritation is the consequence of such severe burns, with shivering, vomiting, weakness, anxiety, cold extremities, quick feeble pulse, and frequently distressing dyspnoea, with effusion in the chest.

But it is a remarkable fact, that persons so badly burned or scalded that death takes place in a few hours after, the patients sometimes appear quite comfortable, with intellect unimpaired, and without apparent suffering. This condition may continue within a few minutes of dissolution, when they rapidly sink.

Treatment.—The two most important points in the treatment of burns are, the management of the constitutional symptoms in severe cases, and the prevention of adhesions and contractions in the progress of healing and cicatrization. The treatment of burns of the simplest degree is very easy, and can be effected by the application of cold water, spirits of turpentine, linimentum calcis, raw cotton, or a bandage tightly applied, which is the method of Velpeau. An excellent mode of treatment is the combination of these two last: cover the part, particularly if it be extensive, with raw cotton, and apply a bandage firmly over it.

In the treatment of burns of the second degree, if there be rigor and much constitutional depression, it will be necessary to give stimulants; but these should be given with great moderation, for, after reaction, the opposite course is frequently necessary.

In the management of the injured part, if the cuticle be raised by vesication, the serum should be carefully evacuated, so as to employ the cuticle as a protection. The applications recommended in the first instance should then be used.

In extensive injuries of the skin, where the cuticle has been entirely removed, and left an ulcerated surface, Sir Astley Cooper recommends the application of spirits of turpentine: when it creates too much pain, dilute it with olive oil, or olive oil and lime-

water. Raw cotton is sometimes employed as an application in these cases; but some surgeons object to it. Mr. Liston prefers dusting the part with common flour, or any other fine and dry powder. Relief is afforded by this application; it absorbs the discharge, and forms a protection to the ulcer. When necessary, this crust can be removed by emollient poultices, which are serviceable applications in this stage of the ulcer; then the powder may be reapplied. Sometimes it may be found useful to apply a cloth, wet with the spirits of turpentine, to the raw surface, covering this with raw cotton, and applying a bandage over all.

In the management of burns of the third degree of intensity, the first object to be accomplished is to establish reaction; which must be done through the employment of stimulants, combined with opiates. But these means must be used with caution, for reaction is sometimes soon established, and proceeds even to inflammation, and the case calls for the lancet, to arrest it.

In these cases the life of the affected part is entirely destroyed, and the only local treatment required is the application of emollient poultices until the eschar is removed; when the treatment becomes the same as directed for the ulcerated burn.

The neighbouring parts of a burn of the last degree, not much involved primarily, subsequently slough by inflammatory action.

Sores resulting from burns are difficult to heal, owing to diminished vital force; consequently, the granulations are flabby, the discharges thin and profuse. Therefore, stimulating applications are indicated, and a solution of creasote may be advantageously added to those already enumerated.

The inflammation from burns is frequently violent, and difficult to manage. Great care is necessary when burned surfaces begin to heal, from the remarkable tendency they have towards contractions and adhesions of their surfaces; therefore, when a burn is situated near or about a joint, Sir Astley Cooper's advice, to apply a splint to the part, should not be neglected. If the hand and fingers be involved, a splint should be placed upon the hand, with the fingers widely separated, and each finger secured by a bandage.

The most strict attention should be paid at this time to keep the healing surfaces apart, to prevent deformity.

CARBUNCLE, OR ANTHRAX.

Carbuncle has its origin in a peculiar constitutional irritability, and consists in inflammation and death of a portion of the subcutaneous cellular tissue; mortification usually being the result of acute local inflammation; it is generally situated on the back, neck, face, or head.

Diagnosis.—It may be recognised by a deep-seated, hard, circumscribed, inflamed tumour, accompanied with severe burning pain. After a few days the tumour becomes livid, soft, and spongy, and small ulcers form upon its surface, discharging an acrid, sanious fluid. The discharge from carbuncle generally resembles a dirty-looking mixture of flour and water. This disease is not dangerous, except when seated on the scalp, but is always painful.

The *treatment* consists in the use of emollient poultice, incision, and the application of caustic potassa. Patients affected with carbuncle are generally debilitated in constitution; therefore nutritive and tonic regimen is necessary.

When the numerous superficial ulcers appear, the treatment recommended by Dr. Physick is the proper course. This consists in making a crucial incision into the body of the tumour, and then applying caustic potassa freely to the whole surface; this is to be followed by an emollient poultice, the object being to remove the sphacelated and diseased tissue, and produce a healthy surface. In the earlier stages of the inflammation, emollient poultice should be kept applied; and there is no reason why the death of the part, which is sure to result, should not be hastened by the application of caustic potassa, and thus save much time and suffering, provided the tumour be circumscribed by the inflammatory action.

BOIL, OR FURUNCULUS.

Furunculus is the same disease as anthrax, only in milder form, and in more limited extent, and requires no other treatment than

the application of emollient poultice, with the use of the lancet, when suppuration is established, to aid the discharge of pus and dead cellular membrane, commonly called the *core*.

EFFECTS OF COLD.

Frostbite is inflammation excited by the direct application of cold. Parts thus affected have great tendency to mortification.

Treatment.—When a part is frozen, gentle friction with snow, camphorated or volatile liniment, should be employed, great care being taken not to break or injure the part. Whilst the part remains frozen, it has no sensibility, and is whitish in colour. But when reaction is established, it assumes a livid hue, is inflamed, swollen, and painful. From the tendency in these cases to gangrene and sloughing, stimulating applications, as a general rule, are required; but after mortification occurs, it must be treated as in other cases. Patients entirely insensible from cold, or where the system is generally affected, should be placed in a cool room, and the frictions already recommended applied generally, to re-establish the circulation. To excite respiration, volatile and sternutatory applications should be made; but the best means of restoring respiration is to surround the chest by a broad bandage, the ends of which should be torn into strips about two inches wide; these should be interlocked with those of the opposite end, and crossed upon the chest; then, by exerting gradual but strong compression of the chest, by means of alternate traction and relaxation of the ends of the bandage, the mechanical movements of the chest in breathing are artificially produced, and complete respiration is induced.

Care should be taken to imitate nature in the gradual and easy contractions and expansions of the thorax,—a caution even more necessary where inflation of the lungs is effected with a bellows.

In severe cases, stimulants and tonics are necessary to support nature's crippled powers. A continuance of all these means is frequently called for during a long time, and they should not be abandoned until all hope of recovery has vanished, or the system is entirely restored.

PERNIO, OR CHILBLAIN.

Chilblain is inflammation produced by cold, and should be treated according to the principles already laid down. A strong solution of chloride of soda is a useful application in this condition.

ULCERS.

An ulcer is a purulent solution of continuity of the soft parts of an animal body.

There are no affections which the surgeon is more frequently called upon to treat than ulcers, nor are there any more difficult, as a general rule, to manage. There is no point more important in the treatment of this class of affections than the condition of the constitution; it should occupy an important position in their management, whatever local attention the case may claim.

SIMPLE ULCER.—This is caused generally by injury or abscess; it is healthy in its character, and requires merely time, rest, and protection from external injury for its cure.

Diagnosis.—Its appearance is bright red; the granulations are moist, and convey to the mind an idea of health; it is evidently a regenerating action that is going on, which is the opposite of disease. It is impossible to describe the exact difference between a perfectly healthy granulating surface and one taking on a diseased condition; this must be acquired by observation. But very little experience enables one to attain the knowledge needed for a correct conclusion. The remedies recommended in these cases are simple cerate, Turner's cerate, dry lint, bread-and-milk poultice, &c. But the best treatment is rest, proper position, and the absence of local applications.

INDOLENT ULCER.—This arises from constitutional debility, causing generally the slightest injury or simple sore to degenerate into an indolent ulcer.

Diagnosis.—The appearance of the ulcer is flabby, pale, and the granulations are high and rounded. It has little vascularity or

sensibility, and discharges a thin, gleetly matter. The surrounding parts are dark-coloured and unhealthy.

Treatment.—This consists principally in the re-establishment of constitutional vigour by means of exercise, fresh air, good diet, tonics, the regulation of the biliary secretions and action of the abdominal viscera. All local applications must be of a stimulating nature, for the disease is dependent upon reduced vital action, or rather the condition of the part is below the healthy point of nature, and therefore must be elevated by artificial means. The best mode of managing this ulcer is the free application of caustic potassa, nitrate of silver, sulphate of copper, or creasote in solution, to its whole surface, followed by an emollient poultice. When the surface is cleansed, if the ulcer be upon the leg, which is frequently the case, apply a roller smoothly and firmly from the toes to the seat of the ulcer; then apply adhesive straps in such a manner that the edges of the ulcer will be brought as nearly as possible



together, leaving spaces, or cutting an opening for the flow of pus. Continue to pass the roller firmly over the ulcer and straps as high as the knee-joint.

If the surface of the ulcer require further stimulation, apply a solution of sulphate of copper, or sulphate of zinc, from one to six grains to the ounce of water, according to the degree of action it is

necessary to excite. Dr. Physick employed an application of British oil 3ij, simple cerate 3j, mixed; the strength to be gradually increased. Tinctures and aqueous solutions are at all times preferable to greasy applications. When healthy granulations appear, and the ulcer has become a simple sore, rest is then necessary.

IRRITABLE ULCER.—This is the opposite of the former. Here the disease consists in over-action of the part, and the object of treatment is to reduce this to its normal level.

Diagnosis.—The appearance of this ulcer is excavated, with rough, jagged, overhanging edges, and the surrounding parts highly inflamed. There is no appearance of granulations; but on the contrary, the surface of the ulcer is covered by a spongy gray, or dusky red slough, which bleeds from the slightest touch. The whole ulcer and surrounding parts are exceedingly painful.

Treatment.—This must be antiphlogistic, and consist in the use of saline and mercurial purgatives, and the employment of antimonials internally. Perfect rest, and an elevated position of the part, so that gravitation may act as a depleting agent, is absolutely necessary. The applications to the ulcer must be of a soothing character, and consist of emollient poultice, the vapour bath, and an aqueous solution of opium, applied to the surface of the ulcer, to allay pain.

Mr. Liston recommends local depletion, by means of punctures, in the surrounding inflamed, swollen, and painful integument.

SINUS.

A sinus signifies a narrow tract or canal, by which a deep-seated or burrowing abscess discharges its matter externally through the soft parts. If the sinus continue long, its sides become lined by a secreting membrane, which makes it difficult to heal.

Treatment.—Pressure by compress and bandage over the site of the sinus often succeeds in effecting a cure. Injection of the sinus with a solution of nitrate of silver, sulphate of copper, or chloride of zinc, from one to six grains or more to the ounce of water, or a dilute solution of the chloride of soda, or tincture of iodine, with pressure, will succeed when pressure alone fails.

These stimulants can often be advantageously applied by saturating lint, and passing it into the sinus, until adhesive action is excited, changing the lint every morning. The sulphate of copper is probably oftener successful than any other. It is sometimes necessary to open sinuses, and insert lint saturated with these stimulating solutions; this can be readily done when the sinus is superficial, by passing a grooved director along the sinus, and dividing the integument with a sharp-pointed knife. But this operation cannot be performed when the sinus runs under important nerves and blood-vessels, or the spermatic cord, as sometimes happens. In these cases a stick of caustic potassa should be introduced, and allowed to remain in the sinus an instant, to destroy its parietes; and when the slough separates, pressure will complete the cure.

ABSCESS.

An abscess is a collection of pus in a part, resulting from inflammation. Before the formation of pus takes place, the part is hot, tumefied, throbbing, and painful; these symptoms generally cease about the time suppuration takes place, at which period, if the part affected be an important organ, or the space be large, there is well-marked rigor.

Properties of pus.—Pus, which is ordinarily called healthy, is an opaque, yellowish-white fluid, of about the consistence of cream; neither acid nor alkaline, without odour, having a sweetish taste; insoluble in water, but readily mixing with it; is slow to putrefy, and is not a corrosive liquid. Pus is composed of a thin serum and a great number of solid particles, which give it colour and opacity. The solid particles, under the microscope, are observed to be opaque, spherical globules, which cannot be distinguished from mucus globules. They measure from $\frac{1}{3000}$ to $\frac{1}{2000}$ of an inch in diameter; some are much larger.

The specific gravity of pus varies from 1.021 to 1.040, its density depending upon the number of globules it contains. Pus is coagulated by a strong solution of the hydrochlorate of ammonia; freezing renders pus viscid; a temperature of 165° F. coagulates it, by coagulating the albumen in the serum.

Chemical analysis.—According to Davy, Bennet, and Gueterbock, it contains all the proximate elements of blood, except the colouring matter.

Abscesses are named according to the situation they occupy, as empyema in the thorax, hypopion in the chambers of the eye, arthropuosis in a joint, lumbar in the pelvis, maxillary in the face, mammary in the breast, hepatic in the liver, femoral in the thigh, whitlow in the finger.

Inflammation of the lymphatic glands frequently results in abscess. Abscesses often form immediately over blood-vessels. When situated thus, it is necessary to be careful, in making the diagnosis, to avoid mistaking aneurism for a simple abscess. This has occurred, and may occur again. Even Dupuytren once made this false diagnosis, and plunged a lancet into an aneurism. There is no difficulty, however, in distinguishing one from the other, if proper care be exercised.

The diagnostic signs of aneurism may be contrasted with abscess thus:—

IN ANEURISM.	IN ABSCESS.
The formation of the tumour is gradual.	} It is rapid.
The skin covering it is of natural colour, or pale and œdematous.	
From the earliest stage, the tumour is of natural temperature, and is soft and fluctuating.	} It is inflamed and discoloured.
The tumour is pulsating.	} It is very hot and throbbing. It is hard and incompressible.
The enlargement can be obliterated by pressure.	} It is fluctuating, but has no pulsation.
	} It cannot be diminished by pressure.

EMPYEMA is a collection of matter in the cavity of the pleura; the effect of traumatic or idiopathic inflammation.

Diagnosis.—It may be recognised by dulness on percussion; dyspnœa; difficulty of lying on the sound side; gradual enlargement of the chest, and œdema of the parietes of the thorax.

Treatment.—This consists in supporting the health of the pa-

tient by tonics, and drawing off the matter by the operation of *paracentesis thoracis*, which may be performed either with a trocar or a bistoury: the latter is preferable, since the point of the trocar is apt to wound the lung. An incision should be made with a sharp-pointed bistoury, a little above the sixth rib, about its middle; the pleura is to be penetrated carefully, and the incision enlarged by means of a probe-pointed bistoury; the wound must be made parallel with the rib, and about an inch and a half long. The matter having been evacuated, a tent is then placed in the wound, to allow free egress to the accumulating pus; the chest is firmly bandaged, and the patient supported by tonics and good diet until resolution occurs.

HYPOPION.—This consists in the accumulation of pus in the chambers of the eye.

Treatment.—When absorption of the pus cannot be induced, and the matter becomes troublesome by distending the eye, it should be evacuated by perforating the cornea; followed by emollient and anodyne applications. The poultice may, in this case, as in all others in which emollient poultice is required, consist of flaxseed meal, slippery elm, pith of sassafras, grated carrot, or of several folds of linen or lint saturated with warm water. These poultices are made by pouring hot or boiling water upon the substance to be employed: when an anodyne effect is desirable, laudanum, or a solution of sulphate of morphia, is added. The effect produced by these various emollients is the same; the only objects gained by the poultice being the application of heat and moisture, therefore the substance employed should always be used in large quantity, and covered by a piece of oiled silk, to control evaporation. There is none better nor more agreeable, from its cleanliness and facility of renewal, than the linen or lint poultice.

ARTHROPUOSIS is a collection of pus in a joint, resulting from inflammation of its synovial membrane.

Diagnosis.—This may be recognised by enlargement of the joint, and constant pain, with considerable constitutional excitement, all of which remain unmitigated by treatment.

Treatment.—Make a valvular opening from the most depending part into the joint, evacuate the matter, and place the part in

splints, giving it the most easy position possible. Support the patient by tonics and proper diet.

The *Prognosis* is unfavourable; for ankylosis may result, or even amputation become necessary.

LUMBAR ABSCESS.—This abscess is formed in the pelvis and lumbar region, situated in the cellular tissue of the psoas and iliacus muscles: it is generally found in scrofulous persons. This is not a common abscess; it arises from inflammation of the soft parts or caries of the lumbar vertebræ.

Diagnosis.—Pain in the lumbar region, from the kidney down the outside of the thigh; uneasiness in the spermatic cord of the affected side, and the testicle is drawn up; great muscular debility and fatigue upon the slightest exercise. These symptoms remain for months, and are suddenly broken by rigors, loss of appetite, debility, and hectic. The abscess, following the course of the psoas and iliacus muscles, points under Poupart's ligament, and can be felt fluctuating. It sometimes opens into the bladder, rectum, or externally through the ischiatic notch.

Prognosis.—Is very unfavourable, since few recover; and those who do, always remain debilitated.

Treatment.—Many advocate allowing the abscess to open spontaneously; and all agree, where the knife is used, in making a minute opening, and drawing off but a small quantity of matter at a time. Blisters are recommended to be applied over the tumour, although they would probably do more good applied to the lumbar region: at all events, the most important point is the health of the patient, which must be attended to, and supported by good diet and tonics.

MAXILLARY ABSCESS.—This is an exceedingly painful disease, whether it be situated in the antrum, which is rare, or in other parts of the face. It arises from inflammation caused by cold or decayed teeth.

Diagnosis.—Abscess of the antrum maxillare may exist for months, or years, without being discovered. There is a constant, severe, deep-seated pain in the whole side of the face, and the teeth of the affected side, some of which are often extracted, under the erroneous idea that they alone are the cause of the pain. It often

happens that the face swells very much, and the matter is discharged through the cheek; but it is more frequently discharged into the nostril, and has a most offensive odour.

Prognosis.—This is not always favourable, for the fœtid discharge from the antrum continues to flow sometimes for years, and it seems impossible to stop it. Yet the disease, generally, is susceptible of cure.

Treatment.—There are three modes of treatment adopted for the cure of this abscess. La Morier's mode is to perforate the antrum above the first molar, by means of a small trephine. Another mode is recommended by Jourdain, which is to pass the beak of a syringe up the nostril and into the antrum; (but the mucous membrane lining the antrum must be at this time so swollen that it is nearly impossible to accomplish the object.)

This abscess is rarely unconnected with caries of some of the teeth near or entering it; therefore, the best operation, as a general rule, is the extraction of the first molar tooth, and perforation of the antrum by passing a stilet up the socket of the tooth, and thus enter the cavity of the antrum, and give free egress to the matter. This should be followed by astringent injections, as oak-bark, tincture of myrrh, &c.; or, what is better, the chloride of soda or lime in solution, with tincture of opium. Injections should be used four or five times a day until all discharge ceases, and the part has returned to a healthy state. A piece of lint should be kept in the opening into the antrum, until it is healed at the bottom.

Abscess of a very painful kind often forms along the alveoli of the inferior maxillary bone; as well as in the superior, above the incisor teeth. These abscesses should be early opened by a deep cut of the knife, which should always feel the bone, so as to divide freely the inflamed periosteum. Follow this by emollient and anodyne poultices, and the part soon returns to health.

MAMMARY ABSCESS.—This form of abscess is very common among lying-in women; the most frequent cause of which is too rich and stimulating diet immediately after delivery.

Diagnosis.—Tumefaction of the breast, with throbbing pain, followed very soon by rigor or chill; thirst, fever, and restlessness

ensue; the breast becomes enlarged, and so painful that the lightest touch cannot be endured, and the secretion of milk is entirely arrested. The matter is frequently contained in several cysts.

Prognosis.—Is favourable; unless it is allowed to continue for a long time, and to wear the patient out by hectic; but, when taken in time, and properly managed, a cure is soon effected.

Treatment.—The treatment consists in emollient poultice, and free incision into the abscess. The poultice should be continued as long as there is free discharge of pus. If sinuses form, they must be obliterated by well-directed pressure, by means of compress and roller.

HEPATIC ABSCESS.—This may arise from inflammation of the liver, caused by congestion; the presence of foreign bodies, as biliary concretions, worms, &c., or from injuries of the head. It is most commonly met with in the East and West Indies.

Diagnosis.—There is deep-seated pain in the right side, with swelling; the patient lies easier upon the affected side; there is more or less pain in the right shoulder. Rigors precede and accompany the suppuration. In an advanced stage of the disease, distinct fluctuation can be felt; the patient feels the greatest possible muscular debility, and he is frequently reduced by copious discharges of pus per rectum: hectic fever soon follows.

The abscess may either point externally or open into the stomach, intestines, or into the cavity of the chest, whence it is coughed up, or it may be poured into the cavity of the peritoneum.

Prognosis.—Is exceedingly unfavourable. Few live long with this disease, and none entirely recover their health.

Treatment.—The principal point in the treatment is to support the strength of the patient by good diet and tonics. When the abscess points externally, an incision may be made into the part which seems the spot selected by nature for the egress of the matter. This can be done with a lancet, bistoury, or trocar; the point of incision may be through the intercostal muscles, or the walls of the abdomen, the choice depending entirely upon the pointing of the abscess. The wound should be kept open, by introducing lint into it, until nearly all discharge has ceased. The patient should be supported by good diet and tonics. This is the

most favourable form of the disease, although extremely dangerous.

FEMORAL ABSCESS.—This abscess is more frequently found in the young than the old ; it consists in a deposit of matter under the fascia lata.

Diagnosis.—There is pain resembling rheumatism, extending the whole length of the thigh, and a hard unyielding tumefaction, generally above the middle of the thigh ; the pain increases with the swelling and prevents sleep, notwithstanding the patient may have taken large anodyne doses. The constitutional symptoms are well marked, as fever, rigors, debility, and hectic.

This disease may be confounded with psoas abscess. The matter finding no escape through the fascia lata, which takes on ulceration slowly, travels down the thigh and leg, dissecting out the cellular tissue from the muscles, and sometimes even pointing at the ankle.

Prognosis—Not always favourable, as it is a difficult case to cure, and patients sometimes sink under the exhausting drain ; still the cases are not many that cannot be managed.

Treatment.—Blisters over the part are sometimes beneficial ; they should be kept open for about two weeks, by the application of savin cerate, or mezereon ointment. The usual mode of treatment, is to make a valvular opening with a lancet in the most dependent part, and drain the matter away gradually, being careful, at the same time, not to allow air to enter, as it is said to increase the inflammation and constitutional symptoms ; this great dread probably is generally overrated ; after the pus is drained off, a roller is to be firmly applied, and every means taken to insure adhesion of the walls of the abscess ; lint should be placed in the wound to prevent its closure before the walls of the abscess are united. It is necessary at the same time to support the strength of the patient by tonics and rich diet.

PARONYCHIA OR WHITLOW.—This is an abscess seated generally on the fingers, but sometimes attacking the toes. Four varieties of this disease are spoken of : the first is seated under the cuticle, at the root and sides of the nail ; the second has its seat in the cellular membrane under the cutis ; the third, in the sheath of the

tendons, or theca, about the hand; the fourth is seated in the periosteum. It makes little difference, however, in a practical point of view, where the seat of the inflammation may be. Whitlow is always an exceedingly painful disease, and frequently causes great deformity of the fingers, and sometimes even the loss of the hand; it is of frequent occurrence, and should, therefore, be well comprehended; it is a disease perfectly easy to manage, but when wrongly treated, becomes very troublesome. Whitlow is generally caused by a slight hurt, or prick of the finger; seamen are particularly liable to it, as well as those whose occupations require the hands to be frequently immersed in warm water.

Diagnosis.—There is deep-seated pain in the finger, redness, swelling, and throbbing; the pain soon becomes intolerable, and the patient can sleep neither night nor day; little or no fluctuation is perceptible, from the matter being bound down by the unyielding fascia, or theca; therefore, it burrows through the hand, causing caries of the bones or ankylosis of the joints, frequently requiring amputation of the fingers and parts of the hand. It is said death has occurred from this cause.

Prognosis.—When the disease is taken in time it is favourable, and the reverse if proper treatment be long deferred.

Treatment.—The best mode of treating this disease is the early application of the knife. The moment the part becomes hot, tense, and painful, a free incision should be made down to the bone; the entrance of the knife should not stop until the point reaches the bone, then carry it along boldly throughout the extent of the inflamed part, which generally occupies but one phalanx. This simple operation, followed by emollient poultice, (whether suppuration has occurred or not,) suffices for the cure. The poultice should be continued until granulations begin to appear, when simple dressings or dry lint may be substituted. It is advisable to divide the periosteum, because it is generally involved, if it be not the primary cause of the difficulty, and by dividing this, you are sure of having divided all the parts that can possibly be implicated. In neglected cases, where the matter has burrowed, and caries of the bones has occurred, the loose portions of the bone should be taken away, and free incisions made to evacuate the matter.

Emollient poultices should be applied, and the hand slung so as to allow the matter by gravitation to fall into the poultice. If the granulations become exuberant, which is often the case, the application of the nitrate of silver will soon suppress them. In the early stage of whitlow, the free application of the nitrate of silver to the part, or a blister, will sometimes arrest the inflammation and cure the disease.

ABSCESS IN LYMPHATIC GLANDS.—Inflammation of the lymphatic glands is very liable to produce abscess; its seat is generally in the groin, axilla, or neck.

Diagnosis.—Before suppuration takes place, the gland is hard, hot, painful, and swollen; the lymphatic vessels and surrounding skin are red. After suppuration has taken place, there is evident fluctuation.

Prognosis—Is favourable; still in some cases, as syphilitic and scrofulous patients, the abscess may remain a long time before a cure can be effected; but abscess of the glands in healthy constitutions is generally susceptible of rapid cure.

Treatment.—The matter should be evacuated by free incision, and an emollient poultice applied; generally nothing more is required to effect a cure; but in some cases the surface of the abscess becomes indolent, and continues to discharge pus; it is then necessary to fill the cavity with lint, saturated in some stimulant solution, as sulphate of copper, one or two grains or more to the ounce of water. When an abscess is situated about the face or neck of a lady, it may be desirable to avoid an incision on account of the cicatrix; in such cases, a seton of saddler's silk can be passed through it; by this means the matter is gradually evacuated, and sufficient action excited, when aided by pressure, to effect a cure.

WOUNDS.

All wounds should be of importance in the eyes of the surgeon, for the most insignificant frequently cause much suffering, and even death. Hemorrhage, erysipelas, mortification, hectic, and

tetanus, may result from any wound. Wounds heal either by *adhesion* or *granulation*.

Wounds are classified into incised, contused, lacerated, punctured, poisoned, and gun-shot wounds.

INCISED WOUND is a solution of continuity in the soft parts, produced by a cutting edge, giving greater surface than depth of wound; its troublesome feature is hemorrhage.

Diagnosis is very easy, since the injury is superficial and its nature can always be seen at a glance; if the hemorrhage be arterial, the blood spouts in jets, and has a florid-red colour; in venous hemorrhage, there is a gradual flow of purple blood.

Prognosis is favourable; incised wounds unite more readily than any others.

Treatment.—This consists in the removal of foreign bodies, suppression of hemorrhage, and coaptation and retention of the cut surfaces and edges. Arterial hemorrhage is most effectually commanded by the application of a ligature to the ends of the divided vessel, for it is often necessary in incised wounds, to tie both extremities of the cut artery; still when they are small, hemorrhage may be effectually arrested by twisting the ends of the vessel with a pair of forceps, or simple compression will sometimes suffice; hemorrhage having been arrested, and coagula removed, the sides and edges of the incised parts should be accurately brought together, and retained in apposition by as little dressing as will suffice. As a general rule, nothing more will be required than the application of lint and adhesive straps. Excessive action in the part should be combated by the application of cold. Incised wounds treated thus, usually unite by adhesion.

CONTUSED WOUND is one inflicted by a blunt surface, which does not generally break or divide the external surface; the hemorrhage is therefore internal, and not great, owing to the loss of vitality in the extremities of the torn vessels, and the pressure upon them by the effusion in the parts: the pain is in inverse ratio to the extent and severity of the wound, for in severe contusions the life of the part being immediately destroyed, little or no pain results; but in slight cases, the pain is intense. In severe cases, where death of the parts is complete, adhesion is impossible; it must slough: in

slight cases, suppuration usually follows, or the effused blood may be absorbed.

Diagnosis.—The nature of the wound is at once recognised, from the tumefied, discolored, ecchymosed appearance of the injured part.

Prognosis.—In severe cases it is unfavourable, for extensive loss of substance, spreading mortification, prostration, hectic, amputation, and even loss of life may follow. In slight cases the prognosis is favourable; yet this wound, from its very nature, is more or less tedious.

Treatment.—The first object should be to prevent inflammation: to do this the application of cold or local depletion may be necessary; these means however should not be employed, unless the case demand them. The application to the injured part should be calculated to hasten suppuration, or its separation; therefore, the emollient poultice is the proper means to be employed in almost all cases: when the slough separates, this application should be changed to simple dressings, and support to the part by adhesive straps, or the application of cold water; for tone and contractile power are always needed after the subsidence of local inflammation, with destruction of tissue; as heretofore explained. Where constitutional debility accompanies this injury, general nutritive and tonic treatment must be attended to as well as its local management.

LACERATED WOUND is a solution of continuity wherein the soft parts are rent or torn asunder by violence; leaving a ragged, irregular wound, which differs from incised wound in its uneven edge, less disposition to bleed, and greater or less degree of contusion. The largest arteries may be torn across without the occurrence of dangerous hemorrhage. The constitutional effect of a lacerated wound, is much greater than of an incised wound; the nervous system frequently suffers much; even spasms of the limbs and tetanus occur. Lacerated wound is prone to inflammation. Erysipelas often follows lacerated wounds of the scalp.

Diagnosis.—The nature of the injury is always apparent.

Prognosis depends upon the extent and seat of the injury. When it is extensive and situated in the scalp, or in parts plenti-

fully supplied with nerves, or where aponeuroses are extensively lacerated, the opinion should be guarded; for although the result may be, and often is favourable, yet too often it is the reverse. Where the laceration is slight, and the torn part is not important, the prognosis is favourable.

Treatment in this variety of wound has to be conducted with much judgment. The points to be gained first, are the removal of foreign bodies, and the arrest of hemorrhage, which is rarely troublesome, in these cases; the parts should then be placed in apposition and secured by adhesive straps. Cold applications should be employed to combat inflammation; but in this case they must be used with caution, not to add to the depressing effect of the injury upon the constitution. Local depletion may be resorted to, always however, with the same caution. Constitutional treatment may be called for in some cases, both by general blood-letting, and active purgation, to subdue inflammatory fever.

Lacerated wounds generally suppurate, or slough, and consequently heal by granulation. When inflammation is established, the local application must consist in emollient poultice. The constitutional treatment in cases of extensive sloughing, should be nutritive diet, and the administration of tonics.

Secondary hemorrhage must be looked for, and guarded against: when abscess forms in the neighbourhood of the injury, or purulent infiltration occurs, free incisions must be made to give exit to the matter, and the abscess treated as usual.

PUNCTURED WOUND.

A punctured wound is made by a sharp narrow instrument, as a needle, pin, thorn, nail, splinter, &c. It seldom causes much inconvenience when slight; this depends a good deal, however, upon the constitution of the patient, and the situation of the wound. A slight wound among tendons, nerves, and fasciæ, sometimes causes *tetanus*. Large collections of matter may form under the fasciæ, producing great distress, and deformity.

The *lymphatics* often swell from punctured wounds: a wound

of the foot sometimes causes bubo, and a punctured wound of the finger or hand, enlargement of the glands of the axilla: a red line generally runs along the lymphatics from the wound to the enlarged gland.

PENETRATING WOUND.

A penetrating wound is more extensive than a punctured wound, and is generally situated in the large cavities, as the thorax, and abdomen, wounding important viscera, nerves, and blood-vessels. This variety of wound is mostly inflicted by the sword, dirk, or bayonet, and partakes more or less of the nature of a contused or lacerated wound; the parts through which the instrument passes being forcibly rent asunder, and not divided as by a sharp-edged instrument: it is to this circumstance that the violent nervous agitation, and ill effects which frequently follow this kind of injury, is attributed.

Diagnosis is always difficult in these cases; for although there is not the least difficulty in recognising the nature of the wound, yet it is no easy matter to diagnosticate the precise organs, and parts injured, and to determine the extent of the injury; therefore, much care, time, and attention should be devoted to severe cases of this kind. By close examination of the form of the wound—and the instrument with which it was inflicted, some idea may be conceived of its depth and direction.

Prognosis.—This is always doubtful in punctured and penetrating wounds, for it is impossible to say whether a case will terminate favourably or not. If the puncture be very slight, then the prognosis may be favourable; yet even slight hurts sometimes give much trouble.

Treatment.—This must be adapted to the nature and extent of the injury. The two principal indications, are to remove foreign bodies, (which may be discovered by carefully probing the wound,) and the arrest of hemorrhage: this last is not always easily accomplished, for the wounded vessel or vessels may be beyond our reach, as in wounds of the abdomen, lungs, &c., or they may

be situated under fasciæ, among tendons, or between bones; in these cases it is necessary to look to another point than the seat of the injury, to arrest the hemorrhage. When the lungs or abdomen are the seat of the wound, venesection must be resorted to, in order to divert the flow of blood from the wounded organ or part, and allow the blood to coagulate, and by means of the coagula the hemorrhage may be arrested. When the wound is situated in a limb where it cannot be reached, then the main trunk or the principal vessel supplying the part should be ligated. When pressure alone is equal to the task of arresting the hemorrhage, it should always be employed; pressure may be applied directly to the part by a compress and roller, or by pressure upon the main trunk, as the radial and ulnar arteries, for wounds of the palmar arches, the tibial arteries in wounds of the foot, &c. In slight cases, rest and the application of cold will be sufficient to effect a cure; but in severe cases very different treatment is necessary. Efforts should always be made to prevent suppuration: when this occurs an emollient poultice should be applied.

The wound should never be dilated when it can be avoided; but when hemorrhage is profuse from a divided or punctured artery, pressure being inapplicable or having failed, and deligation of the vessel is inevitable, it becomes necessary to cut down upon and secure it: again, it may be necessary to dilate the wound by the knife, in order to remove a portion of the instrument which inflicted the wound. Dilatation by free incision is called for when suppuration and diffuse infiltration has taken place beneath fasciæ, tendons, and aponeuroses, for without it structure is destroyed, and the most violent constitutional symptoms supervene. Constitutional symptoms must be combated upon antiphlogistic principles, and as a general rule, opium should be freely given to procure sleep and allay nervous irritation. If the system be reduced by profuse suppuration, then a tonic course is necessary.

POISONED WOUND.—It has been proven by Blake, that poisons enter and pervade the system by means of the blood, the nervous effect being secondary. The shortest time necessary for the absorption being nine seconds; it is also observable that all tissues

do not suffer alike, but on the contrary, the nervous tissue is most susceptible to their action.

When a poison has been absorbed into the system, there is a species of fermentation produced in the blood, termed *zymosis*: the poison by this process is multiplied; this process of *zymosis* goes on rapidly in cases of poisoning by the most venomous snakes, and very slowly with some other poisons, as syphilis, and hydrophobia, but more rapidly in dissection wounds.

The most virulent poisons cause death speedily, through nervous depression. In hydrophobia, the result of poison from rabid animals, on the contrary, it seems to be through excessive excitement of the nervous system.

Diagnosis in Hydrophobia must be divided into two stages; the first included between the receipt of the bite and the development of the strong and active symptoms of the disease; this period of latency varies from two to ten weeks. After the infliction of the bite the wound heals in the ordinary way, but after a longer or shorter time, itching and pain are felt in the cicatrix; the pain increases and runs up the nerves of the limb without discoloration, but the cicatrix now becomes discoloured, ulcerates, and discharges a thin pus. There is febrile disorder, headache, restlessness, shooting pains in various parts of the body, and much excitement of the nervous system, with acuteness of the senses, memory strong, imagination vivid, animated countenance, eyes bright, but intolerant of light. This state is apt to be followed by despondency, and then comes the dread of fluids; this first stage lasts from three to four days. In the second stage there is dread of liquids, agitation, spasm of the muscles of respiration, and convulsive breathing produced by the sight of fluids. The patient is aware of his state, and although thirsty, cannot overcome the instinctive aversion and inability to swallow liquids, which probably arises from spasm of the pharynx: sleep is now entirely lost, and the patient sinks into a state of despair. As the disease advances the cerebral excitement increases; occasionally there is wild delirium; the eyes are bloodshot, staring, and never shut; hearing, sight, and touch are very acute; speech is rapid and abrupt; at length delirium is confirmed, spasm of the muscles of the throat

increase, and in one of these paroxysms the patient is asphyxiated, or sinks from exhaustion during a remission.

Prognosis is extremely unfavourable; scarce any recover, but almost all die miserably.

Treatment is exceedingly unsatisfactory, and but little comprehended in this disease. The prophylactic treatment should never be postponed or omitted; it consists in passing a ligature tightly around the limb, above the injury, and the excision of a portion of sound flesh with the wounded. This should be followed by a cupping glass, to extract the virus by derivation, and thus float it out of the system upon the venous blood; the part should then be well touched with nitrate of silver. But, unfortunately, when the poison has been absorbed, and the system brought under its influence, there is no treatment, of which we have any knowledge, at all efficacious. Almost all remedies have been tried in this disease, but the following are the most relied on: bleeding, alcoholic drinks, opium, aconite, belladonna, Indian hemp, and hyoscyamus. They are given in large doses, and frequently repeated. There is great tolerance of these remedies engendered by the diseased action. Chloroform and ether have both been recommended and tried of late, but without as yet adding much to our curative means in this incomprehensible disease. Still, where death is inevitable, it is proper to try any remedy that seems to hold forth the least chance of success.

Poison by venomous snakes, like every other virus inoculation, is carried into the system by the vehicle afforded by the venous circulation.

Diagnosis is never difficult, from the nature of the wound being known to the patient. The symptoms attending severe cases are pain running along the course of the nerves, swelling, stiffness of the muscles of the part; inflammation sets in rapidly; the constitutional disturbance is great; mortification and death follow. In mild cases, where the character of the poison is not of this subtle nature, the symptoms are less severe, and the injury terminates in suppuration, or may be dispersed without inflammation.

Prognosis in severe cases is unfavourable; in mild ones favourable.

Treatment must be directed to the prevention of absorption, to extraction of the virus, and to combat inflammation. The first step is to place a ligature tightly around the limb, above the wound; the second to excise not only the injured part, but a small portion of the surrounding flesh; the third to apply suction, either with a cupping-glass, or by the mouth of a second individual, taking care to direct the person to spit, or wash the mouth frequently, whilst engaged in sucking the wound, and see that the mouth is perfectly sound, and the mucous membrane unbroken: without this precaution the poison might be transferred to the operator. The part should then be well touched with a stick of nitrate of silver, or moderately strong aqua ammonia, and kept at rest. If inflammation and constitutional symptoms follow, they must be treated upon the principles already laid down for such cases. The bites of poisonous insects can be cured by pressure, the application of nitrate of silver, aqua ammonia, or tincture of iodine.

Poison by dissection wounds are precisely of the same character with the former, and must be treated in the same way. Generally nothing more is necessary than suction and the application of nitrate of silver; yet when the general system of the dissector is debilitated, (which is apt to be the case towards the close of the session,) great care should be bestowed upon the wound. If it show signs of inflammation, and dark red lines begin to show themselves running up the arm, and inflaming the lymphatic glands, local and general antiphlogistic treatment should at once be instituted; for these cases sometimes terminate seriously, and even fatally. Still, in this country, dissection wounds are comparatively innocent; it is rare even to see the glands of the axilla at all enlarged; nevertheless, the simple but efficient prophylactic means recommended should never be neglected.

GUN-SHOT WOUND is one inflicted by any substance projected by the explosion of gunpowder, as fragments of shell, splinters of wood or stone, wads, and shot of every description. The orifice made by the entrance of a ball appears smaller than the ball itself, and the edges of the wound are inverted; the orifice of exit is larger, and ragged or splintered, with everted edges. There is no

difficulty in determining in what direction the ball approached the body.

The positions of the orifices of a gun-shot wound, it should be remembered, are not certain indications of the track of the missile inflicting them; for musket or pistol balls are very easily reflected or turned from their line of direction by fasciæ, bones, tendons, &c. Therefore the only means of knowing certainly the route a ball has taken, is by the aid of the finger or probe. Thus, wounds of the head, chest, and abdomen often appear fatal, from the position of the two external wounds, when in reality they are merely superficial, owing to the reflection of the ball by the cranium, ribs, or abdominal aponeurosis. The same may be said when there is but one external wound, the ball having glanced and lodged. It sometimes happens that a ball is split by striking the edge of a bone, and thus inflicts two internal injuries. Gun-shot wounds are *contused wounds*, where the surface is not broken; they are *contused and lacerated*, where the surface of the soft parts is broken.

Simple fractures from gun-shot wounds are rare; they are generally compound comminuted fractures. Nerves seem to suffer more from gun-shot wounds than from any other variety of wounds, tetanus being unfortunately a too frequent result of these injuries. Severe pain and neuralgia often continue for weeks, months, and even years after the receipt of the wound. Primary hemorrhage is rarely troublesome from this wound, unless its seat be in the lungs or abdomen. The vessels being contused or entirely deadened by the force of the blow, their torn extremities collapse, and thus give time for coagula to form; or if it do not succeed unaided, the bleeding may generally be arrested by very little effort on the part of the surgeon. The contusion occasioned by the passage of a ball is serious; when it acts on a large artery, which is often the case, the danger is not from immediate hemorrhage, but from the insidious form of the wound, which may not be suspected until to the astonishment of the surgeon, the vessel sloughs, and the patient is lost, or so debilitated that nature and art can hardly build him up again. Therefore it is necessary to be upon the watch for secondary hemorrhage.

The chronic effects of gun-shot wounds are often lamentable and

serious, as inflammatory fever, erysipelas, abscess, purulent infiltration, inflammation of veins and arteries, hemorrhage from the separation of sloughs, or ulcerations, mortification, nonunion of fracture, necrosis, caries, exhaustion by hectic, tetanus, and death.

There have been various speculations respecting the *windage* of balls. It is a popular belief with soldiers and sailors that the mere concussion of the air, while a ball is passing very near the body, has often been fatal. This notion may have had its origin in the severe contusions inflicted by balls striking very obliquely, so as not to break the skin, leaving scarcely any external mark, or in cases where the ball has entered a natural opening, producing death without an apparent wound.

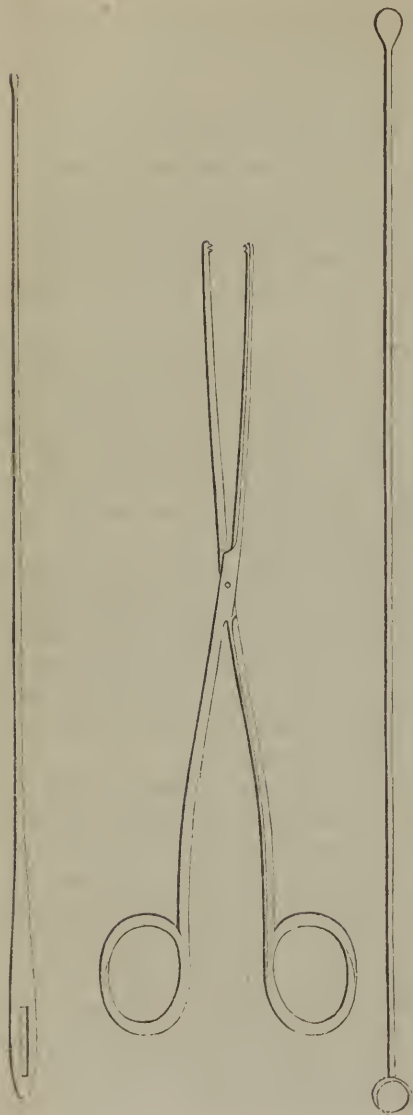
I have seen many cases in point. After a skirmish, one of the dead was found without apparent wound. His comrades were at no loss to account for it by the windage of a ball. Surgical examination discovered the cause in a ball lodged in the spinal marrow, which had entered the open mouth. On the other hand, there were no serious effects, even when the chin, nose, cheeks, or lips were brushed by the passage of balls.

Diagnosis.—As to the direction of the ball, the organs and tissues wounded, and the extent of the injury, is no easy matter. Many cases tax to the utmost the knowledge and discrimination of the surgeon in determining the precise amount of damage; indeed, it is sometimes impossible for the ablest to do this satisfactorily. The utmost care should always be used to attain a diagnosis that will be a sufficient and safe basis of practice.

Where the wound is situated about the extremities, there is generally not much difficulty in making out the exact state of the case; but when the chest, abdomen, head, and neck are the seats of the wound, it is difficult. Fracture of the bones can always be recognised by deformity and crepitation; wounds of the lungs by dyspnoea and expectoration of blood; wounds of the stomach by hæmatemesis, and of the bladder by bloody urine. The nervous system of the bravest and most robust is greatly shocked, even by slight injuries of this kind; pallor of countenance, trembling, anxiety, and fainting, are not uncommon accompaniments of the slightest, as well as of the most severe gun-shot wounds.

Prognosis is either favourable or unfavourable, according to the extent of the injury or the importance of the injured part. A positive opinion should always be given with caution, unless the case be so clear that there is no room for doubt.

Treatment.—This must depend upon the seat and extent of the wound. It is impossible to give more than general rules for the management of this class of injuries. Gun-shot wound unites by *granulation*; it is a lacerated and contused wound; the life of the divided surface is destroyed, and inflammation and sloughing must be the consequence. In the examination, the part must be placed in the position in which it was when the wound was received. The examination should be made as soon after the receipt of the wound as possible, since it is less painful to the patient at this time, and decidedly more satisfactory to the surgeon. This one examination should be thorough and complete; by it the sur-



geon should learn all that is possible to be discovered by exploration. The best instrument for this purpose is the finger, when the wound is large enough and not too deep to admit of it; the next best is Bell's gun-shot probe. If by this exploration any foreign body, as a ball, clothing, etc., be discovered, it should be removed by the bullet forceps, or any other means, it matters not what, so the object is attained. It sometimes happens that balls become imbedded in the cancelli of bones, or in deep-seated parts, buried in fasciæ, tendons, and muscles, where it may be inexpedient to remove them; it is therefore better to leave them, either to come away by suppuration, or to be encysted and remain. When not lodged in an important organ or part, when a ball can be felt beneath the surface of the skin, or is bound down by fascia, it should be at once removed by a counter-opening.

The second step is to arrest the hemorrhage. If the divided vessels be small, nothing more is necessary than a compress and bandage; but if the torn vessels be large arterial trunks, then it will be necessary to deligate them: for this purpose the wound in some cases may be dilated. This should be avoided, if possible; but the vessels must be secured at both the divided extremities. If the plantar or palmar arches be divided, it may often be necessary to take up the tibial, ulnar, or radial artery. When the lungs or abdomen is the seat of the hemorrhage, there is evidently no possibility of ligating the leading trunks; therefore derivation by venesection must be practised, to stop the flow of blood until it can coagulate in the wounded part, and thus arrest hemorrhage by the clot acting as a compress. When a ball has passed through the knee or hip-joint, unless amputation be resorted to, death almost always follows. Even in cases where balls pass through the ankle, elbow, and shoulder-joints, the result is often fatal. Fracture from gun-shot wounds must be treated upon the same principles as fractures from other sources.

In the early stages of gun-shot wound the part is hot, swollen, and painful. The most grateful application to the wound at this time is cold water dressing; but the moment inflammation is established, emollient poultice should be substituted, and continued until the inflammation subsides, when the poultice should be laid

aside, and simple dressings, astringent applications, or cold water dressings applied. When the constitutional symptoms are of an inflammatory character, general blood-letting and purgation must be resorted to; but when debility, from irritation or suppuration, reduces the general health, tonics, good diet, and stimulants must be employed. It often becomes necessary to amputate, when the limb has not been entirely carried away by shot; as in extensive wounds of the joints, and where the principal blood-vessels and nerves of the limb have been shot away, or when the bones and soft parts are much shattered. In these cases, primary amputations often save life, where delay and resort to secondary operations would sacrifice it. Yet a limb should be saved, if possible. Many gun-shot wounds that require primary amputation in the field to save life, may be cured in civil practice without resort to this extreme, from advantage to be derived by rest, and the many attentions and comforts the field does not afford.

Sutures should never be applied to gun-shot wounds; sewing is not needed where integument is divided by the flight of balls. I would not have thought it necessary to have mentioned such a self-evident fact, had I not seen gun-shot wounds sewed up by those from whom better things might have been expected.

TETANUS.

Tetanus is a frequent sequence of gun-shot wounds, either of great or trifling extent. It is a disease of the spinal system, the cerebrum being secondarily affected. Tetanus, in its full acceptance, means spasm, rigidity of all the muscles, making them stiff and straight, as if the body were composed of one piece. *Trismus* is rigidity of the muscles of the neck and face, commonly called *Lock-jaw*. *Emprosthotonos* is bending the body forwards: this occurs when the muscles of the anterior part of the body are the seat of spasm. *Opisthotonos* is of much more frequent occurrence, and signifies bending backwards, from spasm of the posterior muscles: in this variety the body is like a bow. *Pleurothotonos* is bending the body to either side; from spasm of the muscles of one side of the body only.

Tetanus is either *traumatic*, arising from a wound or injury, or *idiopathic*, which is of spontaneous origin. It is also *acute* or *chronic*: the former generally arises from injuries, and is much the more fatal; the latter from the idiopathic or constitutional form, and is more manageable. The more frequent form of the disease is the acute traumatic, which is oftener found in hot than in temperate climates. The chronic idiopathic form is supposed to arise from atmospheric vicissitudes, intestinal or uterine irritation.

In some cases the symptoms appear in a few hours after the receipt of the injury; in others, after the lapse of some days, and during acute inflammation of the part. Frequently, cicatrization is nearly accomplished; in these cases it is supposed to arise from the wounded nerves being entangled in the dense cicatrix. Tetanus rarely makes its appearance in cases which have gone on favourably for three weeks; therefore, after the lapse of this time, without signs of tetanus, the patient may be considered beyond its reach.

Diagnosis.—There is pain and stiffness in the neck and jaws, dryness and soreness of the mouth, swallowing and mastication difficult; the rigidity increases, the muscles of the face are involved, giving a ghastly expression to the countenance; swallowing is accompanied with convulsive efforts; the forehead is wrinkled longitudinally and transversely; the jaws become locked together; the whole body becomes rigid, and occasionally convulsed; the arms, fingers, and tongue remain longest unaffected. The sphincters are generally contracted, the bowels constipated, and urine retained by contraction of the muscular fibres at the neck of the bladder. Occasionally the urine is discharged with great force, owing to relaxation at the neck of the bladder during spasm of the muscular fibres of its body. Intense remittent pains accompany the spasmodic exacerbations, with profuse perspiration, which has a peculiarly pungent odour. The pulse at first is strong and full, but after a time becomes weak and small. The cerebrum does not participate in the disorder until death has nearly approached, and then there is delirium. The patient dies either from spasm of the heart, or from asphyxia during a spasmodic paroxysm; but more frequently from exhaustion, during remission of the spasms.

Prognosis is always unfavourable in the acute form of this disease, for death generally takes place after a few days. The chronic form may continue more than two weeks, yet the patient may recover; the prognosis is, therefore, more favourable in this than in the acute form.

Treatment.—In tetanus this has been, as yet, but experimental, since there is no form of treatment settled upon as a rational and hopeful practice. Remedial means, as comprehended at the present day, seem to hold forth but a slender chance of success in this painful and fatal disorder; therefore, nothing more can be done than to give a catalogue of remedies that have been employed to accomplish this end. The most important principle is the simple and non-irritating treatment of all wounds. The following means have been constantly tried, and it is said of each, occasionally with success: amputation; division of the nerves supplying the part, the incision being deep enough to cut off all nervous communication; the actual cautery; cold bath; hot bath; general bleeding; active purgation; enormous doses of opium; tobacco enemata; large and repeated draughts of brandy; counter-irritation over the spine, with the endermoid use of morphia, aconite, belladonna, &c.; the external application of cold, stimuli being given internally at the same time, and salivation by mercury. Chloroform may probably be useful.

In chronic tetanus, purgatives, continued until the intestinal canal assumes a healthy and regular action, should be tried; at the same time employing gentle antispasmodics, and supporting the system by nourishment. After the tetanic symptoms have subsided, a system of tonic treatment must be adopted, to support the economy and to remove the debility that remains. Heroic remedies are not necessary in the chronic form of the disease, for recovery is as common in the chronic as it is rare in the acute form.

SECOND DIVISION.

Position of the Knife—Strangulated Hernia—Taxis—Application of the Truss—Operation for Strangulated Inguinal Hernia—Operation for Strangulated Femoral Hernia—Operations for Fistula in Ano—Stricture of the Rectum—Foreign Bodies in the Rectum—Prolapsus Ani—Hemorrhoids—Stricture of the Urethra—Passing the Male Catheter—Passing the Female Catheter—Operations for Phimosis—Operation for Paraphimosis—Castration—Operation for Harelip—Strabismus—Removal of Tumours from the Head and Neck—Operation for Pulsating Tumours—Nævi Materni—Tracheotomy—Laryngotomy—Ascites, or Dropsy of the Abdomen—Operation of Paracentesis Thoracis—Operations for Hydrocele—Talipes, or Club-Foot—Inversion of the Toe-Nail—Acupuncture—Arteriotomy—Phlebotomy—Leeching—Cupping—Scarification and Incision—Electricity and Galvanism—Galvano-puncture—Seton—Issue—Cauterization—Moxa—Vaccination—Operations for Varicocele and Cirsocele—Varicose Veins—Ligatures and Sutures—Operations upon the Arteries—Topography of the Neck—Ligation of Arteries—Amputations.

OPERATIONS.

THIS division of the work merely treats of the proper mode of operating, in all cases where it may be needed, without taking any farther cognizance of the case than is necessary to the operation, leaving the description and management of the disease to be treated of at length in the particular class of diseases to which it properly belongs.

POSITION OF THE KNIFE.

There are eight positions in which the knife is directed to be held in operating. There are in reality but four distinct positions, the others consisting in slightly turning the edge and point of the

knife to direct them against the parts to be divided. In the *first*



FIRST POSITION.

position, the knife is held as a dining or table-knife; in the *second*, as a writing-pen. The *third* is like the position used in holding



SECOND POSITION.

the bow of a violin. The *fourth* is intended for puncturing, and the knife is held like a trocar. All these positions should be prac-



THIRD POSITION.

tised; particularly the second, where the knife is held like a pen.

This is a position which is always useful, and seldom need be changed, since almost all varieties of cuts can be made by this hold with great facility and advantage; at least with slight modifications, as turning the cutting edge up for opening abscess, or by closing partially the fingers, bringing the cutting edge towards the palm of the hand, &c.

In minor operations the knife employed is either a bistoury or a scalpel. The former differs from the latter merely in closing upon its handle; whilst the scalpel has no joint, and is therefore preferable to the bistoury, being firmer and more easily handled.

For general use, it is better to have the cutting edge of the scalpel, near the point, very convex; the English pattern is, therefore, far preferable to the French.

STRANGULATED HERNIA.

The first operation to be attempted in strangulated hernia is *taxis*; which consists, first, in relaxing muscular contraction and tensity of tissue, and, secondly, in the application of direct pressure to the part. The first indication is met by means of general blood-letting, the warm bath, the free use of antimony, flexion of the body forwards, and of the thighs upon the body, and tobacco enemata; this last being used with great caution, so as not to produce fatal prostration. The tobacco infusion may be made by adding a pint of boiling water to one drachm of tobacco, allowing it to stand fifteen minutes; strain and cool. Use but one-half of this at a time, watching its effects, which vary in different constitutions. Whilst these means are being employed, cold should be applied to the hernial tumour, to retard the advance of inflammation. When the system and tissues are relaxed, not before, the surgeon should commence with the application of the second stage of the operation, by applying pressure in a direction calculated to force the protruded contents through the canal by which they made their escape from the abdomen. In femoral hernia this pressure (which consists of a twisting, squeezing, or kneading motion, applied with force, but never with violence,) must first be downwards, to bring the contents of the sac down off Poupart's ligament, and then

downwards, to force them through the orifice of the cribriform fascia, and lastly, upwards, to push them along the femoral canal, through the crural ring into the abdomen. In *direct* inguinal hernia, the pressure should be perpendicular to the axis of the body; that is, directly toward the abdomen, when the patient is upon his back, which is always the best position for him: as the exit of the hernia was direct, its return must be by the same route. In oblique inguinal hernia, where the contents of the sac have passed through the abdominal canal into the scrotum, the pressure must be applied upwards and downwards, to force the protrusion into the canal: it should then be obliquely outwards, upwards, and downwards, to carry the hernial contents along the abdominal canal, and force them through the internal ring. Taxis is of the greatest importance, and should be made a matter of especial study, since strangulated hernia is of such frequent occurrence that this little operation, skilfully performed, as often saves life as any other in surgery; and whilst one man, by dexterity and judgment, will always succeed, another will always fail. Taxis should be repeated at intervals of one or two hours until it succeeds, or until all reasonable hope of success is at an end; which is the case when the hernia has been strangulated for about thirty-six hours, or very little beyond this time, for mortification of the intestine occurs rapidly; therefore, a golden rule in strangulated hernia is to operate early, and success will follow: delay is death.

If taxis have been successful, (as in the hands of the skilful it is, ninety-nine times in a hundred cases,) apply a truss, to prevent the recurrence of the accident, and to effect, if possible, the radical cure of the disease.

There is no disease which merits more study and attention on the part of the surgeon than *hernia*, both from its real importance, and the frequency of its occurrence. When it has been reduced by *taxis*, and is susceptible of radical cure by means of the truss, the points of importance are the proper shape, size, and application of the pad, as well as exercising just sufficient pressure to arouse a reparative action in the part, to cause the adhesion of the divided fibres of the rings, also by an increased deposit of fibrin to thicken and strengthen the tissues involved, thus diminishing

the relaxed and forced openings, natural or accidental, so as to preclude the escape of the contents of the cavity. But if the pressure be too great, absorption, created by it, may still more attenuate and weaken the neighbouring tissues, and confirm the affliction. Again, if the pad and pressure be not properly applied, the hernia frequently protrudes, and thus continues the opening, if not enlarge it, by each descent.

The truss should be adapted, in a great measure, to the particular indications of each case.

The truss with which I have been most successful in the radical cure of hernia, is of the following description: it consists of a steel spring surrounding almost the entire pelvis, leaving but the pubis excluded from its embrace; at one end is a piece of ivory the size and shape of half a hen's egg (cut longitudinally); the convex surface of this compress is placed over the hernial canal, pressing upon its internal orifice, wherever situated. If the hernia be inguinal, the larger extremity of the ivory is towards the external ring; if it be femoral hernia, it should be towards Poupart's ligament, and just below it, the vertical direction of the pad corresponding with that of the body, so as to press directly upon the canal. To the flat surface of the ivory, near its centre, but a little nearer the larger extremity than the smaller, is situated a pintle or screw, which passes through an eye or hole in one extremity of the spring, and is secured by means of a nut, which allows it to play loosely on the spring: this arrangement permits the spring to be moved by any motion of the body, without disturbing the point of pressure. At the other extremity of the spring, a few thicknesses of leather are placed, to prevent chafing the skin whenever it comes in contact. The spring should be covered with oiled silk to protect it from perspiration. This truss, when properly made and applied, (both of which are exceedingly easy of accomplishment,) is light, compact, comfortable, and efficient. It should be so constructed as to press upon only two points, one being the opening into the cavity intended to be closed; the other, the fulcrum, as it were, pressing upon the opposite side of the ilium, just where the end of the spring curves round this bone to gain the side and front of the abdomen, where it remains

without pressing upon it. The arch of the spring prevents pressure on the back, (which I have always found painful,) or any part of the abdomen, except where needed. There are no straps or buckles. The truss keeps its place without difficulty. The strength of the spring and amount of pressure, must be regulated according to the case under treatment; if the subject be weak, and his occupation calls for no great muscular exertion, not much force is needed to retain the contents within the abdomen; but if the patient be muscular, and his habits or employment require much muscular action, the spring must be proportionably stiff. Originally, I had this truss made for my own case, having suffered from oblique inguinal hernia for several years during boyhood, and not having derived benefit from the trusses that had been applied and recommended by the best advisers, I applied it, and accomplished a perfect cure in one year, and since that time have produced radical cures in other cases; the time varying from a year to eighteen months for the accomplishment of the object. I can, therefore, recommend this form of truss with confidence. Its neatness, and the ease with which it is worn, are alone sufficient reasons for its use. The poorest cutler can make it by taking the measure of the pelvis with annealed wire, to get the size of the spring.

If taxis have failed to reduce the hernia, there is no choice but death or the knife; which last should be resorted to without delay.

In strangulated oblique inguinal hernia, the most frequent form of the disease, the operation consists in placing the patient on his back, upon a convenient bed or table, with his thighs separated and flexed, his feet resting upon chairs. The surgeon places himself between the thighs of the patient; then picking up the skin over the hernial tumour between his fingers, making a fold of it, he passes a scalpel through the base of this fold and cuts upwards, managing the integuments and knife in such a way, that by this means he will have made an incision about three inches, or at most, four inches, long. No case of hernia, however large, requires a longer incision. This incision should have its upper edge at the neck of the tumour, and extend down on the body. This is an excellent rule for division of the integuments in most operations, and should always be adopted where there is not good rea-

son for omitting it, since it divides in an instant the skin and subcutaneous cellular tissue. This being done, we come to the superficial fascia, which should be pinched up by the forceps, and a small transverse cut made through it by the scalpel, into which



the grooved director must be passed and carried along in the direction of the first incision; the point of the scalpel then carried along the director divides the fascia; the erector muscle and fascia propria are to be treated in the same way; the sac then appears, and this is to be managed the same as the fascia, using great caution not to take up the omentum or intestine in the forceps along with it. When the sac is divided, a quantity of fluid sometimes escapes. At this stage of the operation, we have the intestine, or the omentum, or both before us. The intestine should be examined well to see that it is sound, before being returned to the abdomen; if mortified points or spots be found upon its surface, or if it have been wounded by the knife, these spots should be included in a ligature, both ends of which must be cut short off, and the intestine returned in this way to the abdomen. These ligatures are soon enclosed by deposit of fibrin, and they gradually ulcerate through into the canal, and are discharged per anum in the form of loops, whilst the intestine is repaired from without by the organized fibrin deposit. If the intestine be completely mortified, (which is the case when the operation has been too long delayed,) then it cannot be returned, and it is ne-

cessary to form an *artificial anus*. For this purpose it will be necessary to relieve the stricture and retain the intestines at the groin, applying emollient poultice to favour separation of the mortified part. This may afterwards be cured either by Dupuytren's or Dr. Physick's operation. The former consists in the application of the *enterotome*, a peculiar forcep, constructed for the occasion. With this the two sides of the intestine, which lie together, are pinched, and the instrument left until by ulceration it comes away, or sufficient irritation has been excited by it. Dr. Physick's plan has been considered preferable. This consists in passing a ligature, by means of an armed needle, through the contiguous sides of the intestines as they lie side by side. The ligature should be passed at least an inch from the extremities of the intestines, and then tied rather loosely, otherwise great pain will be occasioned; after about three weeks, the ligature has ulcerated out, the sides of the intestines are fast glued by adhesion, and the *fæces* pass per anum. A compress and truss are applied to the opening in the groin, which after a long time may close, and the case will be cured.

If, however, upon examination the gut be found healthy, (which will be known by its colour being natural, or darkened but slightly,) then the forefinger must be carried up between the sac and the intestine to discover the seat of the stricture; which will be in one of three spots: these are the neck of the *hernial sac*; the *external abdominal ring*, or the *internal ring*. The same exploration serves to discover whether it is an *oblique* or *direct* inguinal hernia, by finding the situation of the epigastric artery, which in the former lies inside of the neck of the sac, in the latter it is on the outside of it, and can readily be felt pulsating. In old inguinal hernias, this is often the only means we have of telling which of the two forms it is.



Having ascertained the point of stricture, all is ready for the insertion of the knife. This should be a probe-pointed bistoury or

scalpel, having only about half an inch of cutting edge, commencing near the point. The ordinary probe or blunt-pointed knife may be covered by a bandage from the heel down, leaving only half an inch of cutting edge exposed. While the nail of the forefinger of the left hand is kept under the point of stricture,



push the knife, with its side lying on the finger, along it till it is introduced into the neck of the sac or under the stricture. When



the edge is under this point, it should be turned directly upwards and a slight incision made; it rarely ever requires more than a slight touch of the edge of the knife, against the tightened band which strangles the intestine, to suffice for its liberation. The stricture removed, the intestine and omentum must be carefully returned to the cavity of the abdomen, the wound brought together by adhesive straps, and cold or simple dressings applied during the cure. Absolute rest is demanded, and the administration of a laxative or mild

enema must prevent constipation. After the part has healed, a proper truss must be applied.

In the operation for *direct inguinal hernia*, the only difference is in the number of tunics covering the hernial sac; this variety being deficient in the coating of the cremaster muscle. But any numerical arrangement of tunics in these operations, must always lead to disappointment and perplexity, if they be expected and looked for. In old hernia for instance, the fasciæ are all thickened and increased, so that no certain number of coverings can be found shutting in a hernial tumour; therefore the only good rule for operation in this disease is to proceed carefully, dividing everything that intervenes between the operator and the hernial sac (which can always be recognised from the superincumbent tissues); this gained, all uncertainty is at an end.

In *femoral hernia*, Sir Astley Cooper operates by making an incision in the form of an inverted J. Mr. Liston makes an incision parallel to and directly over Poupart's ligament; from the centre of this an incision is carried down over the tumour, the length and manner of incision being the same as in the former case.



Other surgeons employ, with equal propriety, a perpendicular incision directly over the tumour, beginning at Poupart's ligament: this makes a smaller external wound, and as the only object is to approach the strictured point, the smaller the opening necessary to accomplish this object, the better.

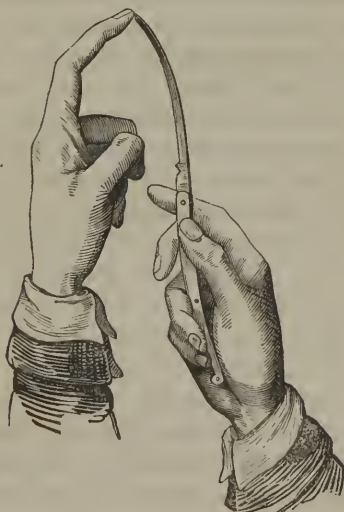
The integuments being divided by either of these incisions, the

superficial fascia must then be raised and divided as already described ; we next come to the fascia propria, which must be raised in like manner, and the hernial sac is brought into view. This, as well as its contents, must be treated in the mode directed for inguinal hernia.

The point of stricture in femoral hernia may either be the *neck of the sack*, the *cribriform fascia*, the *falciform process of the fascia femoris*, the *femoral ring*, or *Hey's or Gimbernat's ligament*. The almost universal point of stricture, is Gimbernat's ligament. The point of stricture being ascertained, and the nail of the forefinger of the left hand thrust into the neck of the sack and under the stricture, the same operation and after treatment must be followed in this as was recommended in inguinal hernia.

FISTULA IN ANO.

It is not always necessary to resort to the knife in fistula in ano.



Many cases can be cured by laxatives, entire rest, the application

of cold, and the introduction of lint wet with a solution of sulphate of copper, two or three grains to the ounce.

Most cases, however, require cutting to accomplish a cure. The patient being placed upon his face and knees, the pelvis elevated, with the thighs separated, or upon his back with the thighs separated and flexed upon the abdomen, the surgeon, oiling the forefinger of the left hand, passes it up the rectum; a narrow probe-pointed scalpel or bistoury is passed up the fistula, until it comes in contact with the finger; if the intestine be not perforated by the disease, the surgeon must make an opening into it by the edge of the knife, and pass it into the cavity of the intestine; the end of the finger is then firmly fixed upon the probe point of the knife and by drawing both outwards, the sphincter muscle and all the intervening tissues are divided.

A better and easier mode of performing the operation, is by passing a grooved director through the stricture, against or into the intestine; then pass into the rectum a smooth rounded stick, like a rectum bougie, the size of the thumb, the stick having a groove upon one side as wide as the finger; this being passed up and held firmly by an assistant, the surgeon takes the director and impinges it firmly against the groove in the stick; he now takes a sharp-pointed knife and runs it forcibly down the groove of the director; the moment it comes in contact with the rectum stick, he makes a strong incision outwards against this, and thus divides the fistula at one sweep. This operation is performed in half the time that the other is, and with much less pain to the patient, and greater convenience to the surgeon. Any one who performs the operation once this way, will not be likely to employ the other mode. The French surgeons, many of them, after dividing the fistula, dissect out its walls; thus cutting out a tube of the indurated soft parts.

In whatever way the operation be performed, after the fistula is divided, lint is to be pushed into the wound, to insure its closing from the bottom by granulations; these gradually push the lint before them. The patient must be kept at rest. Opium should be given to quiet the intestines, and to prevent alvine evacuations. The objects in this operation are, first, to divide the

sphincter ani muscle, for the reason that its contractions draw the sides of the fistula constantly asunder; it can never heal under this state of things; therefore, this obstacle must be removed, and the knife accomplishes this perfectly. Secondly, the introduction of lint is necessary to cause the wound to heal from below, for if it heal first at the intestinal edge, we have the fistula formed anew. The lint should be saturated with a solution of sulphate of copper, two grains to the ounce, and passed to the bottom of the wound to occupy the seat of the fistula, which is somewhat callous, and needs stimulation: the rest of the wound should be filled with dry lint, to keep the edges separated, and the patient kept in bed: if the part become hot and painful, threatening inflammation, cold water should be applied to it until the excitement subsides. There is one point that should not be overlooked in this operation; it is often the case that the probe when passed into a fistula in ano, will pass for a long distance up the perineum: now, danger might arise from deep cutting into this region, and as the cure of the disease does not call for any such risk, it should never be encountered: all the good the knife can accomplish in this case, is the division of the sphincter muscle; for this object an incision an inch, or an inch and a half in depth is all-sufficient, and should never be exceeded.

An efficient and rapid mode of operating in fistula in ano, is to pass a grooved director up the fistula, through the intestine, and bring its point out of the anus, by the aid of the forefinger; there is then a bridge of muscle and integument across the director, which is divided by running a scalpel along the groove of the director, and the operation is accomplished.

STRICTURE OF THE RECTUM.

Stricture of the rectum may be either *spasmodic* or *permanent*: the former must be removed by the employment of remedies which will allay the irritation causing it; the latter, after all excitement and inflammation have been dispersed, must be removed by the use of a gum-elastic or waxed bougie: the bougie should be carefully intro-

duced, and the dilatation gradually effected: the seat of the stricture is generally a short distance above the sphincter ani.

FOREIGN BODIES IN THE RECTUM.

Foreign bodies often lodge in the rectum, and give rise to great inconvenience, and sometimes inflammation; they may call for interference on the part of the surgeon: the foreign substances generally met with are pins and needles, fish and other bones, fruit-stones, and various articles that are occasionally forced in by the anus. One of the most annoying bodies found in the rectum is the *ascaris*, a slender worm, not more than half an inch long, which inhabits the rectum, and creates most intolerable itching: these ascarides are frequently found in great numbers in the rectum.

The operation for the removal of foreign matters, must consist in the employment of the speculum, in all cases where the rectum is not too much blocked up for its use, for it is important to see, if possible the cause of the difficulty. Where bones, needles, and such bodies are to be removed; a pair of forceps is the best instrument to accomplish the object: when ascarides, impacted fæces, &c., are to be removed; the handle of a spoon, a scoop, or an instrument formed like a mustard spoon, will be found the most efficient.

PROLAPSUS ANI.

Prolapsus ani in the adult often requires an operation for its cure. The mode of operation depends upon the state of the case in question. When the mucous membrane has become indurated, and has lost its vascularity, it should be excised by the knife. Great care, however, is necessary in the employment of the knife about the rectum; for fatal hemorrhage sometimes follows its application in improper cases. When the irreducible mucous membrane appears vascular, the ligature is the proper means: this may

consist of strong silk, or thin wire applied with the double canula. One other mode of correcting this disease by operation is to excise folds of the integuments around the anus, in the form of radii: the subsequent cicatrization and retraction diminish the orifice so as to prevent the escape of the bowel. Judgment should be exercised in this operation, or the anus may be made inconveniently small. In prolapsus, the bowels should be kept loose. In all cases, after the rectum has been restored, a T bandage and compress should be habitually worn, and astringent injections used until the prolapsus disappears. A better contrivance would be a T spring, it could easily be adapted to the part, and would keep up constant and efficient pressure.

HEMORRHOIDS.

Hemorrhoidal tumours or piles, are cured by two operations; one consists in removal with the knife or scissors, the other by ligature. There is but one variety of pile that should be excised; that is the external hard tumour, which is evidently not vascular: in such a case, a needle armed with thread should be carried through the base of the tumour, by means of which the tumour can be easily drawn out, and then by one cut of a knife, or the closing of a pair of scissors, it is removed, and but few drops of blood follow. These non-vascular piles, are rarely met with: therefore the safe and efficient operation by *ligature* is in almost all cases called for. This is performed by directing the patient to bear down, in order to protrude well the



tumours; a double canula, about two inches long, as directed by Dr. Physick, is armed with a wire, about the one twenty-fourth or thirtieth of an inch in diameter, well annealed; one end being made fast to the shoulder upon one side, whilst a loop of the wire protrudes from the other end; this loop is passed over the hemor-

rhoidal tumour, and carried well down on its base ; then seizing the free end of the wire with a pair of flat pliers, great force is to be applied—quite as much as the wire will bear ; the second end of the wire is now made fast to the shoulder of the canula ; the tumour may now be opened, if it be desirable to reduce its size, and the whole allowed to hang to the tumour for twelve or twenty-four hours : at the expiration of this time, the wire is untwisted from the canula and shoved through, to disengage it from the neck of the tumour, and by this means it is removed. The tumour at the time will be in a state of mortification, free from pain, black, and shrivelled. An emollient poultice should be applied ; in a few days the tumour comes away. Simple dressings succeed the poultice, and in a short time the case is cured.

The application of the wire in this instance is to destroy at once the life of the part, and, by producing mortification, causing its removal ; therefore, without this wire ligature be tightly tied, (this cannot be overdone,) the life of the part is not entirely destroyed, a sluggish circulation is carried on in it, and thus inflammation, instead of mortification, will be the result. The great point in this operation is to *strangulate* the tumour *completely*.

STRICTURE OF THE URETHRA.

Stricture of the urethra is either *spasmodic* or *permanent*. The former is not as often met with as the latter.

The *treatment* of spasmodic stricture consists in the careful introduction of a bougie or catheter, and the use of antispasmodic remedies locally and generally. As the disease depends upon muscular spasm, one of the best local applications in this form of stricture is the application of the extract of aconite to the perineum, urethra, and bulb.

Permanent stricture is a very common disease ; the seat of this stricture is generally in the membranous portion of the urethra and about its bulb, although it may occur in any part of the passage. This variety of stricture can only be removed by the aid of instruments. Various instruments and modes of cure have been employed

for this object, as waxed, gum elastic, flexible, metallic, and silver bougies and catheters. Caustics are sometimes employed to destroy, the knife and stilet to divide them. But the cure of this disease, in the form it is almost invariably met with, is perfectly easy, and requires nothing more than the silver catheter or bougie, properly employed. The introduction of a waxed bougie, to ascertain the seat and size of the stricture, is superfluous; any one who has sufficient tact to practise surgery can feel that the catheter or bougie has come in contact with the stricture. Its precise seat makes very little difference, either to patient or practitioner. Mr. Liston observes, there is no operation in surgery that requires more skill than passing an instrument through a tight stricture.

In very old, tight, and cartilaginous strictures, division by a cutting instrument may be called for, but the application of caustics rarely, if ever; for the lunar caustic in these cases is capable of accomplishing little or nothing by its superficial action, and potassa is not admissible, from the impossibility of keeping it applied to one spot; it diffuses itself along the urethra, and necessarily cauterizes more of the healthy than of the abnormal structure.

The silver catheter or bougie is the only instrument, in a vast majority of cases, that is required. It is necessary to have catheters varying from the size of a guitar-string to the full size of a healthy urethra. The instrument employed should pass through the stricture without much difficulty. In the passage of bougies and catheters through the urethra, great delicacy should be employed; the instrument should be well oiled, and passed slowly. When it comes to the point of stricture, if it be hard and unyielding, it should be supported by the finger and thumb of the left hand, to prevent too great strain upon the canal in front of the stricture.

The patient should stand with his thighs moderately separated, having all his muscles as much relaxed as possible. The bladder should be emptied before the operation, as the presence of the instrument in the neck of the bladder causes a desire to urinate. After the catheter has been passed into the bladder, it should be given into the hands of the patient, to be retained in the urethra until the pain becomes severe, which is generally from half an hour to two or three hours. The operation should be repeated

every day or two, increasing the size of the instrument as the stricture yields from the absorption caused by the pressure. When



the stricture is nearly dilated, the application of the instrument twice a week will be sufficient. During the employment of instruments, a discharge may be established from the urethra, which, from its mucous character, is often erroneously thought by the patient to be gonorrhœa; but this is nothing more than a mucous discharge, caused by the irritation arising from the pressure.—The catheter, as ordinarily made, is badly formed, being too long in its curves. A catheter similar to the annexed plate, with a short beak and one simple curve, is decidedly superior to any other form, from the greater ease with which it is introduced into the bladder.

A catheter with a conical beak, when skilfully employed, is an excellent instrument for the dilatation of strictures; it acts

on the principle of the wedge, and consequently exerts great power.

Passing the Female Catheter.—This catheter should be about six inches long, and slightly curved, being made either of silver

or gum-elastic. If from prolapsus uteri, or any other cause, there be much change in the relative position of the parts, ocular inspection may be necessary. But under ordinary circumstances the instrument should be passed by the aid of touch alone, exposure of the person being avoided.

The finger having been passed to the commissure of the nymphæ, is moved down in search of the urethral orifice, which may be discovered by feeling a depression, with an elevation on its vaginal aspect; the catheter should now be passed along the finger, and introduced directly into the bladder.

PHIMOSIS.

Phimosis is a contraction of the prepuce in front of the urethra, and the consequent impossibility of drawing the prepuce over the glans penis, so as to expose it.

Phimosis may be either *natural* or *preternatural*, the former of congenital, the latter of diseased origin. The operation for its relief consists in dividing the prepuce by a straight cut, or taking out a triangular or semilunar piece from over the top of the glans—(the triangular is Pancoast's, and the other Lisfranc's operation)—either by scissors or knife. Circumcision is sometimes practised. Probably the best mode of relieving this deformity is that recommended by Mr. Liston, which consists in passing a grooved director, open at the end and well oiled, under the prepuce, alongside of the frænum, taking care not to pass it into the urethra. A sharp-pointed knife is passed along the groove, and emerges at its extremity; then, with one sweep, the prepuce is divided. A portion of the thickened inner surface of the prepuce generally has to be removed. One or two interrupted sutures will now be necessary, to prevent the separation of the skin and inner surface of the prepuce; the penis is then to be supported by a bandage in the upright position, and cold water applied. If the patient be kept quiet, the sutures can be taken away in forty-eight hours: the patient will be entirely well in a few days.

PARAPHIMOSIS.

Paraphimosis is a contraction of the prepuce above the glans penis, thereby strangulating it.

This form may also be *natural* or *preternatural*. The former is rare, but not the latter. The knife is seldom called for in this case; but when it is, there is found a small, tight band of stricture in the prepuce, covered up by the adjoining swelling. These tumefied parts must be separated by the fingers, the strictured band cut through with a sharp point of a knife, and the part immediately drawn over the glans penis. This is Hunter's operation. Richter makes an incision in the skin, and passes a grooved director under the stricture, and then divides it.

AMPUTATION OF THE PENIS.

Ricord's mode of performing this operation is the best, since it obviates one of the greatest difficulties, which is a tendency to retraction of the orifice of the urethra. The penis is put upon the stretch by the left hand, and lopped off by one cut, care being taken to leave skin enough to cover the stumps of the corpora cavernosa. The vessels are secured by ligatures; and the surgeon, seizing the mucous membrane of the urethra with a pair of forceps, makes four slight incisions into it, so as to form four equal flaps; he then passes a ligature, by means of a fine needle, through each flap, and unites each flap of the urethra to the skin by ligature.

The wound generally heals by the first intention; adhesions form between the skin and mucous membrane, and their textures become continuous. The cicatrix then contracting, tends to open the urethra. Where the stump of the penis is very short, the patient does better by micturating through a tube placed against the pubes, to give direction to the stream.

CASTRATION.

The scrotum being shaved, the surgeon grasps it behind, to stretch the skin, and makes an incision from the external abdominal

ring to the bottom of the scrotum, or by gathering it in a fold, passes a knife through the base, and cuts out. The cord is then separated from its attachments, and an assistant holds it between his finger and thumb, to prevent its retraction when divided. The bistoury is carried behind the cord, which is divided, and the operator, seizing its lower portion, draws it forward and dissects out the testicle. The arteries are then tied, and the wound kept open until all bleeding has ceased.

The operation may be performed by separating the testicle from the integuments before dividing the cord; and all fear of irrepressible hemorrhage, by retraction of the vessels of the cord, may be avoided by dissecting the cremaster envelope from the vessels well up towards the abdominal ring, and passing a ligature around them before the cord is divided.

HARE-LIP.

Hare-lip is a fissure or longitudinal division of one or both lips.

It is a congenital deformity of frequent occurrence, and is susceptible of perfect cure by an operation. It is always situated in the upper lip, and may be either single or double. It is often complicated by deformity of the alveolus, causing irregularity and projection of the teeth, and by cleft or fissure of the hard palate.

It is not advisable to operate upon a child until the period of teething has passed; therefore it is generally recommended to wait until after the second year of age. If there be projection of the alveolus and teeth, these must be removed. The teeth can be extracted with forceps, where they alone are at fault; but where the alveolus projects too much, this must be removed, at the same time with the teeth, by dividing the gums where the bone is to be separated, and either cutting through the bony process with a strong scalpel, or dividing it with the bone forceps, and seizing the part firmly, bringing away the teeth and alveolar process at the same time. It is sometimes found that the lip is not free, but is adherent to the mouth internally; where this is the case, it should be dissected up from its adhesions to the mucous membrane of the mouth. These preliminary steps having been taken where they are

necessary, the child, previously bound round by bandages or cloths, so as to confine completely the arms and legs, is held upon the lap of an assistant or nurse ; the surgeon seats himself before the nurse, and places the child's head between his knees ; he then takes a narrow



sharp-pointed knife, and raising the lip with the other hand, passes it through the lip at the top of the fissure, near its edge, and carried down its whole length, removing a strip so wide as to form a smooth, flat surface for union. The other border of the fissure is treated in the same manner. The removal of the edges may be effected equally well with scissors, by cutting upwards from the edge of the lip to the top of the fissure.

The superior coronary arteries now bleed pretty freely, but never require a ligature, as the blood can be arrested by merely pinching or twisting them with forceps. The lips of the wound must be brought together with great care, and accurately adjusted, both as regards the sides and lower edges. A hare-lip pin, or, what is more convenient and quite as good, a common pin or sewing needle, is passed through both sides of the lip, entering and emerging about a quarter of an inch from its cut edges, dipping down through at least two-thirds of its thickness. The first pin should be passed near the edge of the lip, to hold it in accurate adjustment. The twisted suture, of silk ligature, is passed several times around this pin, in the form of a figure 8, sufficiently tight to keep the edges in contact ; a second pin is now passed in like manner, above the first, and the twisted suture applied. Two pins generally suffice ; but where the length of the wound requires more, they should be applied in the same manner. The ligature can be carried from one pin to the other, care being taken not to pucker



the lip. No other dressing is needed. In the course of forty-eight hours, or very little more, the pins should be removed, by first using a rotary motion to loosen them; then draw them out, and let the ligatures remain. They are now saturated with blood, hard, and capable of holding the wound together far better than any other application. Unwaxed silk is better, as more easily saturated with blood. If it be thought necessary to give additional support, to prevent separation, which may sometimes threaten, a strip of adhesive plaster may be carried across the lip and face as far as the ears.

Operation for double hare-lip does not differ in principle from that of single. The only points of difference in practice are cutting two incisions, in the same manner and form as in the first case, and



passing the pins through the three flaps, traversing the centre piece and out again, a quarter of an inch beyond the farthest incision. The centre flap of the lip does not always come low enough to touch the lower lip; therefore the parts must be brought together, and adapted as well as possible, bearing this in mind, that the principal point in the operation is to cut away sufficient of the fissure or fissures to give a smooth surface, and that the parts must be accurately brought together, otherwise there will be deformity.

STRABISMUS.

Strabismus is an affection of the eye by which a person sees objects in an oblique manner, from the axis of vision being distorted.

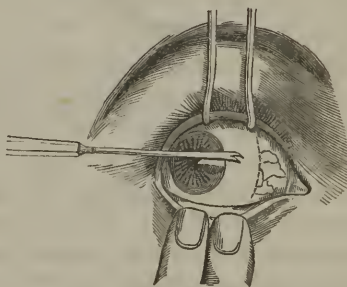
It is a deformity of the eye often met with, and easily removed by an operation, where the deformity does not depend upon paralysis of one of the recti muscles of the eye; but this is rarely the case; the deformity most generally consists in a contraction of the

internal rectus, thus drawing the eye towards and directing the axis across the nose, producing *strabismus convergens*.

The operation is simple, easily performed, and generally succeeds, both in correcting the deformity, and improving the vision. Direct the patient to look outwards, and have the eyelids separated by the fingers of an assistant, or by a speculum; the best for this purpose is the spring-wire speculum, although Pellier's elevator, such as is here exhibited, answers very well. Then with the double hook catch the eye about midway between the edge of



the cornea and canthus; raise the conjunctiva at the canthus by a pair of forceps, and with the curved scissors divide it as well as the cellular tissue beneath; take then the blunt hook and pass it under the tendon of the muscle, raise this on the hook and divide



it with the scissors; the moment the blunt hook is passed under the tendon of the muscle, the double hook may be taken away. The tendon being divided the operation is finished; yet sometimes the eye has still an inclination inwards, even after the tendon has been divided; this is owing to the *intermuscular fascia*. The blunt hook must be placed under this fascia, which is to be divided to the requisite extent, care being taken not to cut through too much, else there will be reversion of the eye.

The operation finished, which occupies but two or three minutes,

the eye should be dressed with a piece of lint and bandage, to keep out light and put the eye at rest. If inflammation threaten, it must be combated by appropriate means; but this seldom occurs. There is sometimes, after the operation, a small tumour or exuberant granulations which spring forth from the incision, occupying the corner of the eye; this should be touched with nitrate of silver, and if necessary, be clipped off by scissors. There is also, after the operation, a certain degree of double vision, which is owing to objects being presented to eyes of different powers and adjustments; this passes off after a time. It often happens that the eye looks a little goggled from the bulging out of the inner side of the ball. The operation for deformity or false direction, in every other case, is performed in like manner with the one already described, and needs, therefore, no especial notice.

TUMOURS OF THE HEAD AND NECK.

Fatty and Encysted Tumours or Wens are of very common occurrence, and from their deformity and increasing bulk, require early removal; they are generally situated about the head, and contain fatty matter in a cyst of cellular tissue.

The *Fatty Tumour* is a lobulated, soft, inelastic, painless, tumour; its growth is slow, but if not interfered with attains large size.

The *Encysted Tumour or Wen* is a rounded, movable, circumscribed, elastic, painless, tumour, which fluctuates indistinctly. It consists of a sac, which is smooth on its internal surface, and contains various matters, sometimes resembling suet, rice, honey, hair, or horn, and sometimes mere water.

The only cure for these tumours is the knife; an elliptical incision should be made through the integuments covering the tumour, so as to leave just enough integument to close the wound. The incision having been made through the skin, it should be dissected from the tumour and this torn from its bed, using the knife only when absolutely necessary; the lips of the wound are to be brought together and retained by adhesive straps.

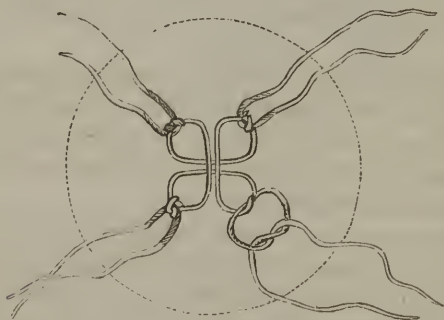
There is a very painful little tumour, about the size of a pea or

bean, sometimes met with. It is subcutaneous, hard, and exceedingly painful to the touch; it is presumed to be a tumour formed in the substance of a nerve. This nervous or painful tumour should always be removed, and the pain and inconvenience will cease with the operation.

PULSATING TUMOURS.

Nævi Materni, or small pulsating tumours, which are, in fact, *aneurisms by anastomosis*, are often found upon the head, face, and neck: they may either be congenital, or the result of some slight injury; they are easily recognised by their red colour, and a thrilling pulsatory sensation communicated to the finger.

Treatment.—The operation by ligature is the proper means to remove these tumours. When the tumour is discovered, even when not larger than the head of a pin, it ought to be operated upon, by passing ligatures in the following manner: having two needles armed with stout ligatures, the ends of which should be of the same length, one of the needles should be entered into the sound integument at the side of the tumour an eighth of an inch



at least from its vascular edge, and forced beneath the tumour into the sound structure, and brought out at the opposite side, at the same distance from the diseased tissue as it was entered. Whilst the first needle is thus under the tumour, the second is entered in

like manner, at right angles to the first, with which the tumour is raised, and the second needle is passed under the first, touching it. This is drawn through, and the loop cut, thus making two ligatures of it. The first needle is also drawn through, and the loop cut. There are now four ligatures under the tumour, through the sound integument and surrounding cellular tissue; the adjoining ends of these must be tied together by the reef-knot. The three first corners should be drawn moderately tight; the last knot must be tied as tightly as possible, and thus completely strangulate the part, which sloughs in a few days. The cavity fills up with granulations, and the disease is eradicated.

In cases where the tumour is very small, a needle armed with a double ligature, as in the previous case, may be passed in the same manner beneath the tumour, and the loop cut, leaving a double ligature. A pin or needle is then passed at right angles to this, beneath the base of the tumour, and the two ligatures tied under the pin or needle, so as to strangulate the tumour; the pin can then be removed, or allowed to remain and come away with the slough. In cases where the aneurismal tumour occupies too large a space for the application of the ligature in the manner described, a darning suture has been recommended and tried with success. It consists in passing a thread in different directions through the tumour, by means of a needle, precisely after the manner of darning. This creates a deposit of fibrin, which closes the cells and vessels of the part, and thus obliterates the disease; but it does not always succeed, and in very vascular tumours may produce troublesome hemorrhage.

A case in a child one year old, which required several applications of the ligature, a little different from the former modes, was successfully treated. It consisted of an aneurism by anastomosis, occupying about one-fourth of the lower lip, passing out on the face at the corner of the mouth, and spreading on the inner side of the lip and lining membrane of the cheek, over a surface of about one inch and a half or two inches in length, and nearly an inch wide. The tumour upon the lip had ulcerated and bled pretty freely, the whole aneurism was fast spreading, and the child would certainly have perished, unless saved by operation. It was evi-

dently impossible to include this aneurismal surface in a ligature, after the modes recommended; therefore the following proceeding was adopted. With a pair of forceps teetthed at the end, the tumour, occupying the inner side of the lip, including the ulcerated edge, was seized, and a strong ligature was placed around the base of all that was included in the forceps, and strangulated. In the course of two weeks the slough came away and the part healed. Then, with the forceps, the tumour occupying the inner side of the cheek was grasped in the same way, always endeavouring to include a little of the healthy structure. The ligature was passed around the base of the portion included in the forceps as before, and in about the same time the slough separated and the part healed. The portion of the aneurism occupying the outer angle of the mouth, upon the face, was ligated by means of the two armed needles and four ligatures, as before described. There was then left only one or two vascular points on the inner surface of the mouth; these were strangulated by passing ligatures, as in the previous operations inside the mouth, and the case was cured without a bad symptom, the suffering of much pain, or the least trouble.

TRACHEOTOMY AND LARYNGOTOMY.

These operations may be called for at any moment to prevent suffocation, when the air-passage is obstructed, either by the presence of a foreign body or the result of disease. Therefore every practitioner should be prepared to give the speediest relief to the suffocating patient.

Tracheotomy is performed by throwing the head of the patient back, and making an incision, an inch and a half long, in the median line, commencing at the cricoid cartilage, extending down towards the sternum, dividing the skin and superficial fascia, separating the sterno-hyoid, loose cellular tissue, and veins from the front of the trachea with the handle of the scalpel. The thyroid gland must be pushed up if it be in the way. The point of the knife is then forced into the trachea with the edge uppermost; and

by cutting upwards, three or four of the rings are divided. The foreign body is then expelled, or it must be searched for, either with a probe, blunt-hook, or forceps. If veins bleed profusely, and cannot otherwise be stopped, they must be tied with a ligature; but generally there is not much hemorrhage. After the foreign body has been removed, and the bleeding ceased, the wound should be brought together and retained by adhesive plaster. If the cause of the operation was dyspnœa, then it will be necessary to introduce a conical curved tube, which should be frequently cleaned of mucus. The trachea soon becomes accustomed to this foreign body, and coughing ceases. When the patient wishes to speak, he must close the orifice of the tube with the finger.

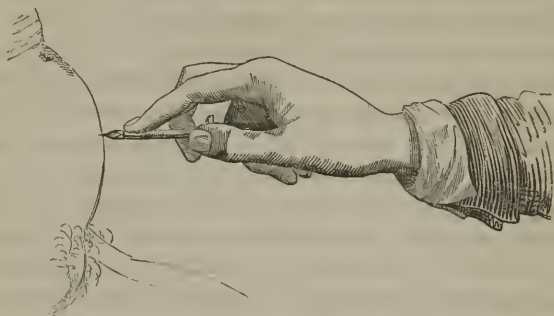
Laryngotomy is very easily performed, and where it will relieve the patient should be preferred to tracheotomy. By feeling about an inch below the pomum Adami, a soft depression is found; this is the *crico-thyroid* membrane. Through this membrane a knife must be pushed at once into the larynx, and the case managed as in tracheotomy.

ASCITES, OR DROPSY OF THE ABDOMEN.

This is an accumulation of water in the abdominal cavity. When threatening suffocation, or causing any serious disturbance, it calls for an operation.

The operation of *paracentesis abdominis* is performed with a knife or trocar. The point of selection is either the linea semilunaris or linea alba; the latter is generally preferred. The bladder having been evacuated, the patient is seated upon the side of the bed, or upon a chair, and a bandage is passed around the body, extending from the thorax to the pelvis, each end of which is firmly held by an assistant, so as to keep firm pressure upon the abdominal cavity during the evacuation of the fluid. In this bandage an opening is made over the linea alba, three or four inches below the navel; a sharp-pointed knife is then to be pushed through this opening directly into the abdomen. This instrument being withdrawn, a canula is then passed through the incision into the cavity, and the water evacuated. The trocar is prefer-

able, by performing the whole manipulation at the time. For this purpose a moderately large, flat, or round trocar is chosen, and at the point directed the trocar is pushed forcibly into the cavity of the abdomen; the stilet is then withdrawn, and the canula is left in the wound. The water passes out freely, while the assistants



keep up pressure by traction upon the ends of the bandage. If the fluid cease running, from the tube being blocked up by omentum or otherwise, a probe should be passed in through the canula to free it. Too much of the fluid should not be drawn off at one operation, unless the patient bear it without faintness. The water having been evacuated, the canula is withdrawn, and the wound closed by a piece of lint and adhesive plaster, the bandage being kept firmly fastened around the abdomen.—Tense and painful œdema of the feet and legs can be effectually relieved by striking the fleam of a spring lancet, or passing the point of a knife through the skin, into the cellular tissue of those parts. Two or three punctures made in this way, which give no pain, will entirely relieve the swelling, by the serum continually leaking from them.

HYDROTHORAX, OR DROPSY OF THE CHEST.

The operation of *paracentesis thoracis* may be performed either by making an incision into the chest with a knife, then passing in a canula, or by pushing a *trocar* directly into the cavity of the thorax, withdrawing the stilet, and leaving the canula within, but

not pushed far enough to irritate the lung, else troublesome coughing will be the consequence. The patient should be placed with the face up, and the head and shoulders thrown back; or, a better position is for him to be lain with the part to be operated upon dependent. Whichever mode of operation be used, the instrument should be passed close to the top of the sixth or seventh rib, to avoid wounding the intercostal artery, which runs along the lower edge of the rib. It is better to make the opening through the integuments valvular, to avoid the passage of air into the chest. This can readily be done by drawing the skin up so as to make it tense over the point of entry; and, when relaxed, it will roll over the aperture like a valve. For the same reason, it is advisable to withdraw the canula before the fluid is entirely evacuated.

It has been recommended by Dr. Fergusson to pierce the chest with acupuncture or grooved needles through the intercostal spaces, and thus allow the serum to pass into the cellular tissue outside the pleura, and be thence absorbed. The serum may be extracted by perforating the intercostal spaces with a grooved needle, and applying a cup to the punctures.

The same operations are applicable to cases of *empyema*, or abscess of the chest: with this difference, that where it is desirable to keep open the wound, lint should be placed between its lips.

HYDROCELE, OR DROPSY OF THE SCROTUM.

Hydrocele, in young subjects, may be cured without an operation, by applications of sal ammoniac and vinegar: liquor ammoniæ acetatis ℥vj; muriate of ammonia ℥ij; M.: or by applying the tincture of iodine to the part, and wearing a bag-truss.

The radical cure of the disease, in adults, requires an operation. The patient should be seated upon the edge of a bed or chair, or standing up with the thighs separated; the surgeon takes the scrotum and posterior part of the tumour in his left hand, and makes it tense, with the right he pushes a sharp pointed knife into the lower and anterior part of the tumour, obliquely upwards and backwards. Upon withdrawing the knife, a canula is passed in, and the fluid drawn off. A better instrument for this operation

is the trocar, which should be thrust in at the same point, and with the same direction as the knife. The stilet being withdrawn, the canula remains; this should be pushed well into the cavity. There must now be injected into the tunica vagi-



nalis (either by a syringe or gum-elastic bag fitted to the canula) two parts of port wine to one of water, or whiskey and water sufficiently strong to cause speedily rather sharp pain along the cord: when this becomes severe, the injection should be allowed to escape. The fluid injected should be sufficient to distend the tunica vaginalis as fully as it was by the dropsical effusion. If the canula do not enter the tunica vaginalis, the cellular membrane will be injected, and extensive sloughing be the consequence. A better injection, in these cases, is the tincture of iodine 3ij, water 3j; M. The quantity used, however, as well as its strength, must vary with the case. This injection has the great advantage of being absorbed readily; therefore, if the injection be passed into the cellular tissue (an accident to which the best surgeons are liable) sloughing will not follow. After sufficient irritation has been created by the injection, which may be known by the sharp pain, the fluid and the canula are withdrawn, and a piece of lint

may be placed upon the wound. In a few hours after, the parts become much swollen, and sometimes require warm poultices and antiphlogistic treatment. But this is not often the case; the swelling usually subsiding in four or five days, when the case is cured.

Many surgeons prefer the *seton*, in hydrocele, to all other means of cure. It may be applied in the following ways:—1st. After the serum has been evacuated as before described, a long needle, armed with a seton, may be passed through the canula and out through the serotum at a point two or three inches from the first orifice; or an ordinary seton-needle can be passed through, by pinching up a fold of the serotum and tunica vaginalis, passing the needle so as to include about three inches between its points of entry and exit. This may remain during ten days or two weeks undisturbed: at the end of this time it can be removed, and the disease is generally cured. Acupuncture, also, has been successfully employed in hydrocele, and may be peculiarly applicable in some cases: it excites the absorption of the liquid contained in the tunica vaginalis.

Hydrocele of the Cord must be treated in the same way as hydrocele of the serotum. When it is large, an operation should not be delayed.

HYDROPHTHALMIA, OR DROPSY OF THE EYE.

When the accumulation of serum in the eye becomes troublesome from excessive distension, causing excruciating pain, threatening inflammation and destruction of the eye, or when sight has been entirely lost, it is necessary to evacuate the serum. This is done by puncturing the eye with a grooved needle, a couching needle, or a common lancet.

All operations for the relief of dropsical affections may need frequent repetition.

TALIPES, OR CLUB-FOOT.

This deformity is produced by rigidity and shortening of the muscles of the leg, caused by anything that interrupts the supply

of nervous influence or proper nutrition of the muscles, and may be consequent upon fevers, injuries of the spine, division of the sciatic nerve, long confinement and inactivity, frequent attacks of rheumatism, or inflammation of the muscles of the calf, or it may be sympathetic, from irritation of any part of the system; but it is mostly congenital, and produced during uterine life. The limb is cold and feeble, the veins small, and muscles wasted.

There are three varieties of club-foot. 1st. *Talipes Equinus*, when the patient walks on the ball of the foot. 2d. *Talipes Varus*, which is the most common form: the heel is raised and the



foot is turned inwards; the patient may walk on its outer edge or on the ankle, and, in very bad cases, on the dorsum of the foot. 3d. *Talipes Valgus*: the foot is twisted outwards, and the patient walks on the inner ankle.

Treatment.—The treatment, in children, consists in the early application of a proper shoe or boot, perfectly adapted to the case. This should be worn constantly until the deformity is removed. Occasionally it is necessary to divide the tendons of the contracted muscles.

Tenotomy is performed with a knife having a short, narrow blade; this is passed under the skin, previously drawn to one side,

so as to remove the external perforation from the incision within; the knife is pushed under the skin and over the tense tendon, the edge is turned down upon this; at the same time the foot is twisted in a manner to tighten the tendon, which is then easily divided; the knife is withdrawn, a piece of lint and sticking-plaster are applied, and in three or four days a boot of the proper form is put on. In adults, where there is great deformity of old standing, it only requires a glance at the skeleton of such an ankle and foot to convince any one that the operation is worse than useless; but there are many cases, even in adults, of inconvenient deformity, of no very great extent anatomically, which are susceptible of great benefit from operation. In these cases the knife and proper apparatus, as already directed, should be employed. There is no difficulty in distinguishing what tendons are to be cut, for they appear like tense bars under the skin.

Talipes Calcaneus is a rare deformity, described by Dr. Little, in which the foot rests upon the back part of the heel.



This distortion admits of little improvement from surgery, excepting as regards appearance.

WHITLOW.

The operation for whitlow is simple, yet is rendered important by the frequency and painfulness of the disorder, and the serious results of delay in the use of the knife. It should be early resorted to, even before the formation of pus. It is well, however, to try first to discuss the inflammation by touching the finger with nitrate of silver, or covering the part with a blister, or even surrounding the finger with emplastrum cantharides. By this means the deep-seated inflammation may often be removed; but if this fail, the knife at once should be appealed to.

This operation is best performed by taking the patient's arm under that of the surgeon, and holding the edge of the knife uppermost; its point should be thrust forcibly to the bone, at the point where the superior part of the incision is desirable. The patient, unable to bear the pain, which is sometimes excruciating, draws or jerks the hand from the surgeon, and in doing this carries the knife along the whole line of the inflamed tissue, and lays it open to the bone. Promote the bleeding, and then apply a poultice, and continue it until granulations begin to appear; then change to simple dressings, keeping the arm in a sling.

INVERSION OF THE TOE-NAIL.

This is both common and exceedingly painful, and generally requires an operation to remove it. When the part is much inflamed, and covered with painful granulations, it should be poulticed, and touched with nitrate of silver. As soon as possible lint should be forced under the corner of the nail, to raise it from its socket of painful flesh, and the toe kept wet with leadwater and laudanum. When the inflammation has subsided, the blade of a pair of scissors should be passed rapidly under the nail, about an eighth of an inch from the affected side, up to the very root, and this portion divided and torn away by forceps, and the part dressed with lint. It is also recommended to remove the whole nail. This

is done by passing the blade of a pair of scissors under the centre of the nail, dividing it throughout its length, and tearing away one-half at a time by forceps.

Generally it is only necessary to remove the corner and a small portion of the side that has grown into the flesh. This should be raised, and a portion taken off. Ever after there should be a little piece of raw cotton or scraped lint kept under the edge of the nail, between it and the side of the toe, care being taken to keep the nail cut short. When there is difficulty in getting at the edge of the nail, lint should be placed upon the tumefied soft parts, and over this a strip of adhesive plaster, so as to press downwards: after this has been worn a few days, the edge of the nail can be raised and removed.

ACUPUNCTURE.

Acupuncturation is performed by running long, fine needles, with a rotary motion, through any part. It is astonishing to what extent these needles may be employed without inconvenience to the patient: five or six may be passed at the same operation, and retained for a short time. Acupuncture is useful in neuralgia, all dropsies, and tumours of bursæ.

ARTERIOTOMY.

This operation, when needed, is generally performed upon the anterior branch of the temporal artery, where it has its course above the outer angle of the eyebrow. The artery is easily found by its pulsations, and should be secured by the fingers of the left hand; the surgeon, holding a thumb-lancet, as in venesection, in the right, cuts the vessel transversely about half through. After sufficient blood has escaped, the vessel should be cut entirely across, and a firm compress and bandage applied, and retained a week or ten days. These operations have no advantage over venesection; but, on the contrary, are attended with evident disadvantage, and therefore should not be practised.

PHLEBOTOMY, OR VENESECTION.

In venesection it is better to select the median-cephalic vein for the operation; to avoid the artery and the cutaneous nerves. A ligature is placed upon the lower third of the arm, with firmness, but not tight enough to arrest pulsation at the wrist; a cane is placed in the hand, to steady it. The operator holds his lancet like a pen, and, standing outside of the arm, cuts obliquely across



the vein, placing his fingers upon the vein to steady it before inserting the lancet. A spring-lancet is probably preferable to the thumb-lancet. The spring-lancet, as ordinarily made, has too weak a spring; which should be very stiff. If the bandage be too tightly tied, the blood soon ceases running; but if it be loosened and re-tied, the blood will flow freely; at the same time directing the patient to grasp firmly the stick, to force the venous circulation into the superficial veins. Sufficient blood having been drawn, the finger should be pressed upon the vein below the wound, the bandage removed from the arm, and a compress placed upon the wound; or, one end of a bandage an inch wide and a yard and a half long is folded a few times upon itself, and placed on the wound as a compress. The bandage is then passed round the elbow, moderately tight, in the form of a figure 8, and secured by a pin. The arm should be kept quiet. The bandage may be removed in twenty-four or thirty-six hours after.

The jugular vein is sometimes opened in cases of apoplexy, and in children, when the veins are hidden at the bend of the arm by fat. This is performed by pressing, with the finger of an assist-

ant, the vein a little above the clavicle, and then making an incision through it, as in the other case. When sufficient blood has been taken, remove the pressure, and apply a compress and adhesive strap. In apoplexy, as in all the cases where general bleeding is called for, the same effect is produced from bleeding at the bend of the arm as in bleeding from the jugular vein.

It sometimes happens, in venesection at the bend of the arm, that the brachial artery is cut. This accident, which gives rise to varicose aneurism if it be not properly treated, can be readily recognised by the bright colour of the blood, and the pulsatory, jetting motion of the stream. When this occurs, the limb should be tightly bandaged with a roller from the hand up to the shoulder, placing a large graduated compress upon the wound at the bend of the arm, and another at the inner side of the biceps cubiti muscle, to press upon the brachial artery. This pressure should be kept up a couple of weeks, and then withdrawn. If no signs of a return of the tumour are manifested, the bandage need not be reapplied.

The occasional results of venesection are abscess, inflammation of the fascia, phlebitis, neuralgia, varicose aneurism, and aneurismal varix.

LEECHING.

Leeches should neither be applied to the eyelids nor the prepuce, as their bite is liable to be followed by erysipelas or œdematous swelling. The part to which they are to be applied should be shaved and washed perfectly clean, and then moistened with milk or blood, and the leeches applied to it by means of a cup, glass, or tube. The best mode of applying them is to wash and shave the part as before, and wet it with sweetened water; place the leeches in a cloth held in the hand, apply them to the surface, and by gentle pressure they can be made to take hold at once upon the desired spot.

Leech-bites sometimes bleed to a troublesome extent before they can be stopped. In this case the bites should be touched with a pointed stick of lunar caustic or a red hot needle, or pass through

the bite a fine needle or pin, and under this a ligature. Leeches should be applied over a bony surface, in children, when it can be done; then the hemorrhage may be arrested by pressure.

CUPPING.

Cupping is more active than leeching, and relieves pain sooner. The only rule to be observed in the use of the scarificator is to avoid setting it too deep, when applied over superficial arteries. The surgeon should never be without an expedient. If the regular cupping apparatus be not at his command, he can operate very well by making small incisions in the integuments with the point of a lancet or knife, and applying custard-cups, wine-glasses, or even small-sized tumblers, and by means of the partial vacuum formed by burning spirits in them, apply thus the principles and practice of cupping almost as effectually as with the aid of the best-made apparatus.

SCARIFICATION AND INCISION.

These operations are performed with a lancet, scalpel, or bistoury: they are necessary in abscess, great tension, extravasation of urine, or unhealthy matters of any kind; in phlegmonous erysipelas, &c.

ELECTRICITY AND GALVANISM.

These means are useful in certain cases, as defective circulation and nervous influence; when a part is benumbed and partially paralysed, as the thigh after sciatica; in atrophy of the extremities, after fever; paralysed muscles, from long disuse, as after disease of joints; deficient menstruation; dyspepsia, from weakness of the stomach; loss of action in the respiratory muscles; loss of voice, from relaxation of the fauces; and all cases of nervous pain unattended with increased vascularity, as hysterical neuralgia.

GALVANO-PUNCTURE.

This operation is performed by introducing two acupuncture needles deeply into the nerve to be affected, at two distant points, including between them the part to be acted upon, and passing a galvanic current through them. This mode of application is beneficial in obstinate neuralgia, and cases of long-standing nervous affections.

SETON.

Setons should be placed, as a general rule, over fasciæ or tendons, as the nape of the neck, insertion of the deltoid, &c. A fold of the skin is pinched up, according to the extent desirable for the seton to occupy, and a seton-needle forced through, with a piece of braid, tape, skein of silk or thread,—or a flat piece of gum-elastic is preferable to all; the long end of the seton should be rolled up and secured near the wound, out of the way of the discharge. Every few days a fresh portion should be drawn into the wound, and the soiled part cut off. Should the discharge from the part be deemed insufficient for the object desired, the seton should have some irritating ointment or other irritating substance applied to it before being drawn through.

A knife or lancet may be used to make the puncture through the integument; and whilst it remains in the wound, a probe should be passed along it and through the integuments; the knife being withdrawn, the probe is carried through, having its eye armed with the seton.

ISSUE.

Issues may be made either by *incision* or *caustic*.

Issue by incision is made by pinching up a fold of the skin, and passing a knife through it, making a slit, into which peas, beans, or other foreign bodies are introduced, to promote the desired amount of irritation and discharge.

Issue by caustic is made by surrounding the selected spot with several layers of sticking-plaster, to protect the skin, leaving uncovered a space the size desired for the issue; to this spot caustic potassa, or equal parts of potassa and soft soap or lime, is applied, and kept there until a sufficiently deep slough has been formed: a poultice should be applied until this separates, and the issue subsequently kept open by repeated applications of the caustic, or the introduction of foreign bodies, as in the former case. Caustic should not be left on too long, when applied near large blood-vessels.

Issues must not be made over projecting points of bone, nor over the bellies of muscles, else they degenerate into obstinate sores. For the spine, place the issue between the spinous and transverse processes; for the hip, behind the great trochanter; for the knee, below the inner tuberosity of the tibia, &c.

CAUTERIZATION.

The *actual cautery* is a frightful, but in some cases an efficient remedy, and not very painful, if the iron be heated to a very high temperature: the pain is in inverse ratio to the temperature of the iron, therefore a white heat is the most humane. The cauterizing iron should have a rounded knob, about the size of an olive. When heated, it can be applied to one or more points, or be drawn along the skin, burning in lines about an inch apart. A poultice should be applied until the shallow eschars separate. The sores can be kept open by repeated applications of the cautery, which some prefer to the ordinary irritating dressings. The actual cautery is often an indispensable means for the arrest of hemorrhage, when it is from numerous small vessels situated in a deep cavity, or occupying a position which cannot be otherwise commanded.

MOXA.

Moxas may be made of the fibres of the *Artemisia chinensis*, or of any porous vegetable substance; lint, impregnated with nitre, or German tinder or spunk makes an excellent moxa. A tube of linen,

about half an inch or an inch in diameter, and several inches long, may be made, and well packed with either of the above substances; when wanted for use, sections half an inch long can be cut off and applied to the skin, touching the edge of the moxa with gum, to make it adhere: the moxa should then be lighted, and allowed to burn down without blowing. Where the lint and nitre are used as the material of the moxa, the surrounding skin should be protected from the sparks by a piece of cloth.

When it is desired to use the moxa as a rubefacient or vesicant, and not as a cauterant, it should be held with dressing-forceps a little distance from the skin, ignited, and blown upon with a blow-pipe until the skin becomes red.

VACCINATION.

This is an easy operation; and, at the same time, an important one. The spot usually selected is about the insertion of the deltoid muscle. If points be used, they should be breathed upon, to moisten the matter. Two or three oblique punctures must be made with the point of a lancet under the cuticle, and the points introduced and allowed to remain three or four minutes. Another mode is to dip the point of a lancet into the clear transparent fluid upon the eighth day, and thus transfer it from the arm of one patient to that of another, introducing it as in the former instance. Quite as efficient a mode of vaccination is to take a well-matured scab (even though it may have been kept for some weeks in a well-stopped bottle), dissolve a portion of it in water, making it about the consistence of pus. By taking this upon the point of a lancet, held like a pen, and making three or four perpendicular cuts through the cuticle, crossing these at right angles with as many more, then pressing the matter well into these cuts with the flat of the lancet, the operation is accomplished. A little blood is mixed with the matter, but enough should not be drawn to run off in a drop.

The matter having been introduced, on the *third* day following, if the finger be passed over the spot, a slight elevation is perceptible; on the *fifth* day there is a pearl-coloured vesicle; on the *eighth*

day the vesicle is perfect, umbilicated at the top, with margin tense and elevated above the surrounding skin. If closely examined on this day, there will be observed from ten to fourteen cells, composing the vesicle. On the morning of the *ninth* day, or evening of the eighth, there is a circular areola formed around the base of the vesicle; the skin becomes red, tense, and painful for some distance around. The axillary glands may become enlarged; even sloughing of the cellular tissue sometimes takes place around the sore, but this is uncommon. There is frequently a good deal of fever at this time, but it rarely requires active treatment. The areola continues forming on the *ninth* and *tenth* days, but on the *eleventh* day it begins to fade. A circular scab forms, of an umbilicated or cupped form, and mahogany colour: this gradually hardens, blackens, and about the *end of the third week* drops off, leaving a circular *scar of small size*, marked with *radiations* and *indentations*. It is not absolutely necessary that febrile symptoms should appear, but without the progress of the local disorder is the same, in all its stages, as described, the system is not protected against small-pox.

Vaccination should not be performed unless the system be healthy and in good condition; but more especially should the skin be entirely free from all eruptions; else the disease is sure to be spurious and non-protective. If the system be once perfectly affected by vaccination, there does not appear to be any good ground to doubt its protective power through life.

VARICOCELE AND CIRSOCELE.

Varicocele consists in a varicose enlargement of the veins of the scrotum; whilst cirsocele, spermatocele, and *corpus pampiniforme*, all signify a varicose condition of the veins of the spermatic cord. Its cause is obstruction to the return of blood: it is oftener seen on the left than on the right side, because the left spermatic vein is pressed upon by fecal accumulations in the sigmoid flexure of the colon, and the course of this vein is longer and less direct than the other, therefore it has to sustain the pressure of a higher

column of blood. In ordinary cases the disease can be cured by placing the scrotum and testis in a tight suspensory bag, which will press the parts firmly against the pubes; apply the tincture of iodine daily to the scrotum over the veins of the affected part, keep the bowels loose, and direct two, three or four cold baths per diem to the parts.

There are some cases which create great inconvenience, from severe pain in the loins and scrotum, loss of appetite, flatulence, a sense of dragging at the stomach, and despondency of mind. In these cases if the means already recommended do not remove the cause of disturbance, other measures must be taken.

Sir Astley Cooper's operation, as practised by Velpeau, appears to hold out as strong hopes of success as any other that has been recommended: this consists in drawing the scrotum of the affected side through a pair of long forceps, or stout probes, held by an assistant; when sufficient of the scrotum is drawn through in this way to leave the testis and varicose veins firmly pressed, after the manner of a permanent bag truss, then several common pins are passed through the scrotum, along the upper edge of the forceps; with a knife or pair of stout scissors the loose scrotum is removed, cutting close to the pins along the forceps; the part having been removed, twisted sutures are passed around the pins, a bag truss applied, and the part kept cool. This operation generally succeeds well, and the scrotum heals kindly; but occasionally there is sup-puration, the pins by ulceration drop out, and the testicle is exposed. In these cases the part must be treated upon general principles: after a time granulations spring up and the testicle is again inclosed.

Davat's method is, to separate the varicose veins from the spermatic nerves and vas deferens, which last can readily be felt as a hard cartilaginous cord, and to pass a pin or needle behind the veins, apply a twisted suture, and thus strangulate the part.

Reynaud separates the nerves and vas deferens, passes a ligature behind the veins, including about an inch of skin, upon which a roll of lint is placed and the ligature tied tightly over it, so as to strangulate completely the veins.

Ricord's operation consists in passing two double ligatures and

compressing the veins between their loops. It is done thus : two needles are armed with double ligatures ; the first needle is passed behind the veins carrying the ligature through and leaving its looped extremity extending ; the second needle is passed through the same orifices in the scrotum, but carrying the ligature in front of the veins, leaving its loop projecting on the opposite side to the first : each ligature is now passed through the loop of the other, surrounding thus the varicose veins of the cord, when they are tightly drawn and fastened to the ends of an instrument like a little horseshoe, so as to be drawn laterally ; they are fastened to a screw on top, and by turning this every day or two the pressure is continued ; after ten to twenty days they are removed.

Breschet's method is by compressing the enlarged veins by means of strong forceps.

Pancoast's operation consists in passing an armed needle behind the veins, excluding always the spermatic nerves and vas deferens ; the needle is removed, leaving the ligature behind the veins ; it is then passed unarmed through the same orifices in the scrotum, but in front of the spermatic vein ; the loop of the ligature is passed over one end of the needle, and over the other end the ligature is tied as tightly as possible, to strangulate the veins completely. Apply a poultice and remove the ligature in eleven days.

The palliative treatment consists in the application of pressure by means of a gum-elastic bag truss.

VARICOSE VEINS.

This condition of varix is generally found in the veins of the scrotum, and rectum, but most commonly on the lower extremity, in the saphena vein : like cirsocele, it is caused by anything which retards the venous circulation. Sometimes the veins are very large without occasioning any inconvenience ; but generally there is great pain, weight, and fatigue, felt upon standing or taking exercise.

The *palliative* treatment, consists in frictions of the part with mercurial and iodine ointments, or of iodine, and compression

by means of laced bandages, or the firm application of gum-elastic cloth to the limb, first covering it with muslin or linen, which makes the application of the gum-cloth more agreeable, and it does not slip down. The bowels must be kept loose during the treatment; whilst rest and an elevated position of the part should be enjoined.

The *radical* treatment includes various operations. Sir B. Brodie passes a narrow curved sharp-pointed knife, with a convex cutting edge, between the vein and the skin, thrusting it in upon its side; the knife being under the skin and above the vein, is turned downwards, so as to cut through the vein as it is withdrawn. Another mode of operation, introduced by Brodié, is to pass a needle below the vein and bring its point out through the integuments on the other side; around this the twisted suture is firmly passed and allowed to remain two days, or not longer than condensation of the surrounding tissues and coagulation in the vein have ensued to some extent, and before the ulcerative process has begun. In this operation, as practised by some, the needle is allowed to cut its way out by ulceration; but the former is the safer mode, and Mr. Liston remarks that he has almost always found it successful, and rarely followed by troublesome symptoms.

The caustic operation of Cartwright and Mayo, is highly spoken of by many surgeons. It consists in placing upon the skin, above the vein, a piece of caustic potassa, or potassa and soap or lime of equal parts, about the size of a split pea, covering it with a piece of lint and adhesive plaster; this is allowed to remain a few hours, long enough to destroy the superincumbent parts, but not the vein. The caustic having remained long enough to effect the desired object, is removed, and a poultice applied: after a short time the eschar separates, the vessel is condensed above and below, the sore heals, and the varix diminishes. Mr. Liston recommends this process, as attended with little pain, and no great risk of inflammatory action spreading along the coats of the vessel towards the heart.

The modes of passing needles and employment of ligatures, recommended by Mr. Davat, and Dr. Fricke of Hamburg, have been well tested by Mons. Velpeau, and found to produce un-

pleasant consequences, and even fatal phlebitis. The only safe means for the obliteration of this disease, appears to be the needle operation of Sir B. Brodie, or the caustic of Cartwright and Mayo.

LIGATURES AND SUTURES.

Ligatures at present are almost universally made of twisted silk; the metallic and other substances, tried from time to time, not having been found to answer as good a purpose. The silk should always be quite strong enough for the object in view. It is better to have a ligature a little too short, than to have it break just as the operation is about to be concluded. The numerous sutures of older surgery, (as the glover's, quilled, dry suture, &c.,) have been reduced to two: the *twisted* and *interrupted* sutures.

The interrupted suture is employed to approximate and keep together divided integuments and the edges of wounds, not requiring much force to accomplish these objects. The suture should be passed by a needle from within outwards. It is better, therefore, to arm each end of the ligature with a needle; although it may be passed from without inwards upon one side, the other mode is the better. It should never include anything but integument, and should be passed through the subcutaneous cellular tissue, including sufficient of the edge of the integument to hold firmly; this will vary from one to six lines, according to the particular case in question. The interrupted suture never requires to be drawn together with much force; it should merely be tied tightly enough to bring the parts to which it is applied in apposition, and fastened with a reef-knot.

The *twisted suture* is employed when greater force is necessary than would be advisable with the interrupted suture, and where it is desirable to give support to a surface. The twisted suture is never employed alone, but always in cases where a pin or needle is first passed through the wound, so as to insure the accomplishment of the object: the suture is then passed firmly round this bar, in the form of a figure 8, twisted first over one extremity

of the pin and then obliquely across and under the other end, and tied with a reef or square knot.

The *ligature* is applied to arrest the flow of blood through a vessel, and should be drawn with considerable force, so as to compress the vessel firmly, or to divide completely the internal and middle coats of the artery, which can be felt, whilst drawing the ligature, to give way; thus leaving the cellular coat embraced by the ligature, which ulcerates through this last coat, and comes away in five days to three weeks. The permanent arrest of blood by the action of ligature takes place as follows:—the divided edges of the internal and middle coats unite by adhesion; the blood coagulates between the point of ligature and the first branch given off above it; the ligature divides the external coat by ulceration, and in the course of a short time the portion of the artery occupied by the coagulum becomes a fibrous cord.

Two important rules must be observed in tying arteries: 1st. *Never tie an artery immediately below a large branch.* 2d. *Never separate an artery from its attachments more than is absolutely necessary to ligate it,* and thus avoid cutting off the nutritious circulation of the arterial coats, carried on through the medium of the *vasa arteriorum*.

The manner of tying an artery is perfectly simple: the ligature having been passed around it, one turn of the ends of the thread



is made, and strong traction exerted upon them until the two internal coats give way; the last part of the reef-knot is then tied firmly.

As the first knot is very apt to slip or give before the second is tied, it is better to make two turns with the ends of the ligature, before drawing upon it; when the thread has been drawn sufficiently

tight, if the ends be forcibly swung round at right angles to the knot, it prevents slipping, and the second tie secures the knot entirely.

OPERATIONS UPON THE ARTERIES.

Topography of the Neck.—The mesian line in front, and the two sterno-cleido mastoideus muscles, divide the neck into two *anterior lateral triangles*, whilst the spaces between the sterno-cleido mastoideus muscles and the two trapezius muscles form the two *posterior lateral triangles*. The omo-hyoid muscles divide each of these triangles into two, forming, 1st, the *posterior inferior*; 2d, the *posterior superior*; 3d, the *anterior inferior*; and 4th, the *anterior superior triangles*. The posterior inferior triangle contains the subclavian artery and vein, the brachial plexus of nerves, and the transverse cervical artery. This is the space for the ligation of the subclavian artery above the clavicle. The posterior superior triangle contains the cervical plexus of nerves and lymphatic glands. The anterior inferior triangle contains the carotid artery, internal jugular vein, the par vagum, and sympathetic nerves. The anterior superior triangle is bounded above by the digastric muscle and lingual nerve; it contains the carotid artery, internal jugular vein, descendens noni, par vagum, and sympathetic nerves. In this space the carotid artery is quite superficial, and consequently may be tied with greater facility than in any other. The *digastric space* is formed by the digastric muscle below, and the inferior maxillary bone above: it is divided by the stylo-maxillary ligament into an anterior and posterior part. The anterior digastric space contains the submaxillary gland, the lingual and faecal arteries, the lingual and gustatory nerves, and the sublingual gland. The posterior digastric space contains the parotid gland, external carotid artery, one branch of the seventh pair of nerves, and the portio dura; still more deeply, the styloid process, internal carotid artery, jugular vein, the eighth and ninth pairs, and sympathetic nerve.

LIGATION OF ARTERIES.

LIGATION OF THE RADIAL ARTERY.—A line drawn from the middle of the elbow joint to the styloid process of the radius, marks the course of the artery, which is quite superficial. Its upper half lies between the supinator radii longus at the outer, the pronator radii teres at the inner side: it is between its two venæ comites; the radial nerve, which only touches it about its middle, lies at its outer side, leaving it at its lower third to pass to the back of the fore-arm and hand. In the lower part of its course it is in front of the bone, having the tendon of the flexor carpi radialis within, and the supinator radii longus without: just as the artery is about to pass under the tendons of the extensors of the thumb, it gives off the superficialis volæ, which supplies the muscles of the thumb and anastomoses with the arcus sublimis: the radial artery, getting to the back of the hand, dips down between the metacarpal bones of the first finger and thumb, gets to the palm of the hand, and forms the arcus profunda.

Operation.—The radial artery can be taken up with ease in any part of its course from the wrist to its origin, by pinching up a fold of the skin over its course and passing a scalpel through and cutting out, making an incision in the integuments about an inch in length; the fasciæ must be carefully divided, by pinching up a portion of it at one angle of the external incision and nicking it with the knife, then pass the grooved director underneath and divide it by running the knife along the groove of the director: this is a general rule for getting down upon arteries. Another is, not to separate an artery from the surrounding parts more than is sufficient to pass a ligature around it. The vessel being exposed, an armed needle or the director is passed under it, being careful to separate it from veins and nerves; the ligature is to be tied and one end cut off, the other left hanging from the wound, which should be brought together by adhesive plaster.

LIGATION OF THE ULNAR ARTERY.—A line drawn from the external border of the tendon of the biceps flexor cubiti muscle, to the

radial edge of the middle of the ulna, and then carried to the palmar edge of the pisiforme bone, will mark the course of the artery, which is much more deeply situated than the radial: it has the flexor carpi ulnaris at its inner and the flexor sublimis digitorum on the outer side: it lies on the flexor profundus digitorum, beneath the superficial layer of muscles and the aponeurosis that separates them. At the inferior third of the fore-arm it is superficial, and bounded by the tendons of the above muscles; it passes at the side of the pisiforme bone, over the annular ligament, and, reaching the palm of the hand, forms the *areus sublimis*; it is attended by two *venæ comites*. The ulnar nerve coming from behind the elbow, joins the artery above the middle of the forearm, passing along its ulnar side.

Operation.—The artery can be ligated at any part of its course, by making an incision over it, and proceeding in the same way as in the former case: in taking up the ulnar in its upper third, the incision in the integuments must be at least two inches in length.

LIGATURE OF THE BRACHIAL ARTERY.—This artery lies in the groove between the coraco-brachialis and biceps flexor cubiti in front, and the triceps extensor and insertions of the latissimus dorsi, and teres major behind. In the lower part of the arm it lies in front of the brachialis anticus: the brachial vein is at the inner side; where there are two *venæ comites*; the artery is between them: the internal cutaneous nerve runs somewhat in front and to its inner side. The ulnar nerve is a little within, and behind the artery. The median nerve, in the upper two-thirds of the arm, lies rather in front of the artery at its external margin, and about two inches and a half above the elbow it crosses in front of the artery and gets to its inner side. The brachial vessels are surrounded rather by a loose cellular tissue than a complete sheath.

Operation.—The artery is quite superficial, and may be tied at any part of its course, by pinching up a fold of the integuments over the artery, and dividing them by an incision about two inches in length, and then proceeding with the knife and grooved director as before directed for the division of fascia; place the director under

the vessel, looking carefully that nothing but the artery is included within the ligature.

LIGATURE OF THE SUBCLAVIAN ARTERY.—The subclavian artery emerges from the thorax between the scalenus anticus and medius muscles, and passes under the middle third of the clavicle: it is bounded internally by the tubercle on the first rib and the edge of the scalenus anticus, which muscle separates the artery from the subclavian vein. Externally is the scalenus medius muscle and the brachial plexus of nerves, the nearest nerve of this plexus lying about a quarter of an inch to its outer side and rather behind: this nerve is about the size of the artery, and should not be mistaken for it. Below and anterior to the artery lies the subclavian vein, which receives at the external edge of the scalenus anticus and in contact with the artery, the external jugular, supra-scapular, and sometimes the anterior jugular and acromial veins. The posterior cervical artery arises mostly from the subclavian, and crosses the root of the neck above the subclavian, on the outer face of the scaleni muscles to get to the trapezius, and is often directly in the course of the incision in cutting down upon the subclavian artery.

Operation.—The operation is usually performed in the posterior inferior triangle of the neck. Depress the shoulder and clavicle as much as possible, pinch up a fold of the integuments and make an incision three inches long, parallel with and about half an inch above the clavicle; divide the platysma myoides, and push the omo-hyoideus muscle and external jugular vein out of the way; divide the fascia upon the director, if it cannot be sufficiently broken away with the finger and the handle of the scalpel. If the posterior cervical artery or any other be cut, it must be tied at once; find the tubercle on the first rib with the index finger, and in a groove to its outer side will be felt the artery pulsating; pass an aneurismal needle from below upwards, and from within outwards, guided under the artery by the finger, at the same time pushing the nerves upon its outer side out of the way; assured that nothing but the artery is within the loop of the ligature, tie it, and bring the wound together as in other cases.

LIGATURE OF THE COMMON CAROTID ARTERY.—About the

level of the superior margin of the thyroid cartilage the common carotid divides into the external and internal carotids. The common carotid may be tied at any part of its course, but the place of election is the anterior superior triangle; here the artery is covered merely by the platysma myoides and superficial fascia. The descendens noni passes down in front on the outside of the sheath of the vessels; the vein lies external to the artery; the pneumogastric nerve in the sulcus between and posterior to the vein and artery; these three parts are contained within the sheath; immediately behind it lies the sympathetic nerve. The artery runs beneath the anterior edge of the sterno-cleido mastoideus muscle.

Operation.—Gather up a fold of the integuments, and make an incision about an inch in extent along the edge of this muscle; divide the platysma, fascia, and sheath of the vessels, upon the grooved director, taking care in the division of this last to avoid the descendens noni as much as possible; the sheath being open, pass the director or needle under the artery from without inwards, guarding particularly against including the par vagum in the ligature; it requires but little care to guard against this accident, as the vein, artery, and nerve are separated one from another in a great measure by thin layers of fascia: the vessel having been tied, the wound is brought together as in former cases.

LIGATURE OF THE LINGUAL ARTERY.—The lingual artery arises from the external carotid, above the cornu of the thyroid cartilage; it ascends above the os hyoides to the base of the tongue, passing between the hyoglossus and genio-hyoglossus muscles. The artery is unattended by nerve or vein, but is deeply situated.

Operation.—Throw the head back; make an incision two inches long just above the cornu of the os hyoides; the submaxillary gland is exposed and pushed out of the way; the digastric muscle is pushed upwards, and immediately under it lies the hypoglossal or ninth pair of nerves, which must be pushed up also; about one line below the nerve the pulsations of the lingual artery can be felt through the hyoglossus muscle; this having been divided with great care, an armed aneurismal needle should be passed around the artery, which should be tied, and the wound brought together as in other cases.

LIGATURE OF THE FACIAL ARTERY.—The facial generally comes off from the external carotid, but sometimes arises in common with the lingual artery. It mounts over the inferior maxillary bone in a groove at the anterior border of the masseter muscle. The best place to tie it is at the edge of this muscle, after it has turned over the jaw. The facial vein is at its temporal side; it is crossed by branches of the facial nerve: over this spot the integument is to be raised, and opened to the extent of half an inch or less; the needle carrying the ligature is passed from without inwards, to exclude the vein. Dress the wound as usual.

LIGATURE OF THE ANTERIOR TIBIAL ARTERY.—On the dorsum of the foot the artery passes under the annular ligament, attended by two venæ comites and a nerve. A line drawn from the ankle joint, midway between the malleoli to the interosseous space between the first and second metatarsal bones, will mark out the course of the artery. It rests upon the tarsal bones between the tendon of the extensor pollicis pedis on the inside, and the first tendon of the extensor digitorum brevis on the outside.

Operation.—Raise a fold of the skin on the dorsum of the foot over the course of the artery; divide it by passing a pointed scalpel through the fold, making an incision about an inch in length; divide the fascia with the aid of the handle of the knife and the grooved director, until the artery is laid bare; pass the ligature under it, avoiding the veins and nerve, tie with the surgeon's knot, and bring the parts together with adhesive straps.

LIGATURE OF THE ARTERY AT ITS LOWER THIRD.—Here it lies between the tibialis anticus internally, and the extensor pollicis proprius externally: it is flanked by its venæ comites. The anterior tibial nerve is nearer the surface, lying external to the artery.

Operation.—Feel for the space between the above-named muscles, and divide the skin over it about two inches in length; divide or break through the fascia; separate the muscles with the finger, which may be passed down upon the artery, which lies moderately deep: its pulsations can be felt; pass the director or aneurismal needle under it from without inwards, avoiding the anterior tibial nerve and the veins; tie the vessel and dress the wound as in previous instances.

LIGATURE OF THE ARTERY AT ITS MIDDLE AND UPPER THIRD.

—Here the artery lies between the tibialis anticus internally, and the extensor communis digitorum externally, preserving the same relations with the veins and anterior tibial nerve as in the former position.

Operation.—Feel for the space between the above-named muscles, which is easily found by putting the muscles in action; it is generally about an inch from the spine of the tibia: raise a fold of the skin, making an incision three inches long; separate the muscles with the finger, which, when passed down pretty deeply, will feel the pulsations of the artery; pass the needle from without inwards; tie and dress as in former cases.

LIGATURE OF THE POSTERIOR TIBIAL ARTERY, behind the malleolus internus. The artery lies midway between the edge of the tendo-achillis and the malleolus internus. It is attended by two veins and the posterior tibial nerve, which lies a little distance behind it.

Operation.—Divide the integuments over the course of the artery, which is quite superficial; divide the fascia carefully, and the artery will be found rather behind the malleolus; pass the ligature from behind forwards, including nothing but the artery within its loop; tie, and close the wound as in former instances.

LIGATURE OF THE ARTERY AT ITS UPPER THIRD.—At this part of its course it is rather difficult to ligate; it is situated beneath the soleus muscle and deep-seated aponeurosis of the leg, resting upon the tibialis posticus and flexor longus digitorum, about the middle of the leg. It is attended by two venæ comites and the posterior tibial nerve, which is at its outer side. The artery is about the middle of the diameter of the leg, and very deeply situated.

Operation.—Divide the integuments about an inch behind the inner edge of the tibia, making an incision about four inches long; place the leg in a position to relax the muscles, raise the soleus from the tibia, and divide the deep aponeurosis on the director; then feel the artery with the finger, and direct the aneurismal needle under it, taking care to exclude everything but the artery within the ligature; tie the vessel, and bring the wound together with adhesive straps.

LIGATURE OF THE FEMORAL ARTERY.—This artery is quite superficial, lying in the sulcus between the vastus internus and the adductor muscles. About the middle of the thigh it is covered by the sartorius. The femoral vein, in the upper part of its course, is at its inner side; lower down it gets posterior to it. The crural nerve is about half an inch outside of the artery, two or three of its branches being very near it, one crossing it. The saphenous major descends within the sheath of the vessels, passing along the outer and fore part of the artery down the middle third of the thigh. A line drawn from the middle of Poupart's ligament to the internal condyle of the femur traces the route of the artery.

Operation.—Feel for the depression between the vastus internus and the adductors of the thigh; divide the integuments for about three inches, avoiding the saphenous vein; draw the sartorius muscle to the outside; raise and divide the sheath of the vessels on the director; pass the ligature from within outwards, being careful to exclude the saphenous nerve; tie the vessel, and close the wound as in other cases.

LIGATURE OF THE FEMORAL ABOVE THE PROFUNDA.—The arteria profunda is given off about two inches below the crural arch.

Operation.—Make an incision about three inches long over the course of the artery, commencing at Poupart's ligament; clear away the lymphatic glands and fascia; divide the sheath of the vessels on the director, and pass the ligature between the vein and artery from within outwards; tie the ligature, and bring the wound together as before directed.

LIGATURE OF THE ILIAC ARTERIES.—The primitive iliacs divide opposite the sacro-iliac symphysis into internal and external iliacs. The primitive iliacs are about two inches and a half long: near their bifurcation they are crossed by the ureters, spermatic vessels, and nerves. They lie at the inner side of the psoas muscles. The left iliac, in addition, is crossed by the branches of the inferior mesenteric artery. The internal iliac, about an inch and a half long, is directed downwards and inwards to the sacro-sciatic notch, where it divides into its various branches: the vein lies at its outer side. The external is a continuation of the primitive iliac. A line drawn from the umbilicus to a point half an inch inside of

the centre of Poupart's ligament marks the course of the artery, which is at the inner side of the psoas muscle, with the vein upon its inner, and two or three small nerves from the lumbar plexus at its outer side. The anterior crural nerve lies at the outer side of the psoas muscle. Near Poupart's ligament the external iliac artery gets in front of the psoas muscle: about this point it is crossed by the circumflex ilii vein, spermatic vessels, and vas deferens, which, on turning down into the pelvis, touch its inner side. Just above Poupart's ligament it gives off the epigastric and circumflex ilii arteries.

Operation.—Place the patient on his back, with the thighs and trunk slightly flexed; make an incision through the integuments, half an inch from the external abdominal ring, passing in the direction of the anterior superior spinous process of the ilium, about an inch above Poupart's ligament; cut through the tendon of the external oblique, and get under the edges of the internal oblique and transversalis muscles; raise the fascia transversalis on the director with great care, and divide it; then strip off the peritoneum from the loose cellular tissue with the fingers, and feel for the artery, which can be readily gotten at; pass the aneurismal needle, guided by the finger, from within outwards, avoiding the vein and other vessels; the ligature being passed, tie it, and bring the wound together, dressing as in former instances.

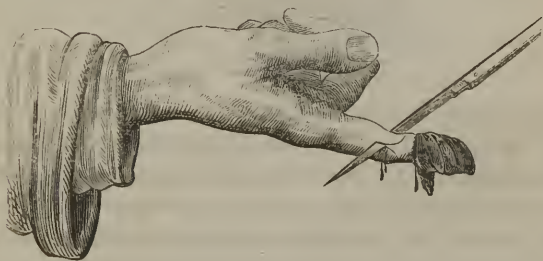
The only difference between tying the external iliac and the primitive iliac is the necessity of carrying the incision higher up towards the crest of the ilium.

It may sometimes be necessary to tie the arteria ad eum abdominis, as well as some branches of the epigastric and circumflex ilii arteries, in this operation.

AMPUTATION OF FINGERS.

In amputation of the fingers there should always be as much of the finger saved as possible. Where the amputation is called for by an accident, crushing the bones and tearing the soft parts, if there be portions of the fingers where the bone, though denuded, is

still sound, here the soft parts should be brought over and adapted as flaps; but where the integument is so much injured that this cannot be done, the bone must be removed: yet a whole phalanx should never be sacrificed, if a portion of it can be saved by sawing through it. The amputation at any of the phalangeal articulations may be either a flap or circular operation. In the flap operation, an assistant grasps the wrist, with the back of the hand up, and separates the other fingers from the one to be operated upon; the surgeon takes hold of the finger with his left hand, bending the joint at a right angle, which is then laid open at its lowest point by a scalpel; the knife, passing through the joint, divides the lateral ligaments; the head of the bone is disarticulated, and the knife, being carried over and behind it, cuts outwards and downwards,



making a flap from the palm or side of the finger sufficiently long to cover the stump. The digital arteries, when twisted by a pair of forceps, generally cease bleeding: should they continue, it will be necessary to tie them; but this is seldom required. When the bleeding has ceased, the edges of the wound are brought together and retained by adhesive straps, and the hand placed in a sling. If heat and inflammation follow, the part should be kept wet with cold water, by placing a piece of lint upon it, and keeping it saturated. The flap can be taken as well from the back of the hand as the palmar surface. In this case it will be necessary to place the palm uppermost, and commence the incision on this surface instead of the other.

In the circular operation, the knife is carried through the integument around the finger, about half its diameter below the joint, the

skin having been previously drawn up as much as possible; the integument is then dissected up to the joint, which is disarticulated. The bleeding having been arrested, as in the former case, the lips of the wound are brought together by adhesive straps, and the hand placed in a sling.

Amputation at the Phalangeo-metacarpal Articulation is very easily effected by an incision commenced on the prominence of the knuckle, and carried, in a semilunar form, around the finger, ter-



minating where it commenced. The convexity of the incision being forward, and on the palmar side of the finger, the tendons and ligaments are then cut across, and the bone disarticulated, and the wound treated as in the former cases. There seems to be good reason to avoid this amputation with the ring and middle fingers, from the fact that the articular extremity of the metacarpal bone, expanded to great extent to give a good surface for motion, when deprived of this function by the removal of its appendage, only serves as a wedge to separate injuriously the other fingers, and which certainly does impair their usefulness, as well as the appearance of the hand. But the metacarpal extremities of the little and forefingers are exceedingly useful as abutments, by which the grasp of the hand is improved. In the case of the other fingers, it is always better to remove a portion of the metacarpal bone.

Amputation of the Metacarpal Bone is easily effected in the following way:—Make an incision through the integuments over the metacarpal bone, commencing about its middle, diverging from the articulation, and carried around this in a semilunar form, so as to meet the first point of the incision about three quarters of an inch above the articulation; then divide the tendons and fascia about

three quarters of an inch or an inch above the articular extremity of the metacarpal bone, laying bare the bone as nearly as possible in its whole circumference, cutting always close against it. A



chain-saw must now be carried under the bone. This can be readily done by means of a large and greatly curved needle, armed with a stout ligature made fast to the eye of the chain-saw: the needle is passed close to and under the bone, and brought out on the opposite side; one extremity of the ligature and the other extremity of the saw is seized and made tense, then, after a see-saw motion two or three times, to loosen the cord, with one strong pull the saw is carried under the bone and out at the other side of the wound; it is then sawed through, and dissected off from the soft parts. This can more readily be done by screwing into the end of the bone to be removed an instrument like a cork-screw: in fact, that variety of cork-screw with a narrow thread running round a spindle, if fitted with the handle of a trocar, would be just the instrument. With this fixed in the end of a bone, it is astonishing with how much facility it can be removed. Or, seize the end of the finger and dissect out the bone from the palmar side, keeping close to it.

The division of the bone can be more readily effected with Liston's bone forceps than with the chain-saw. Care must be taken, however, not to include more than the bone in the forceps.

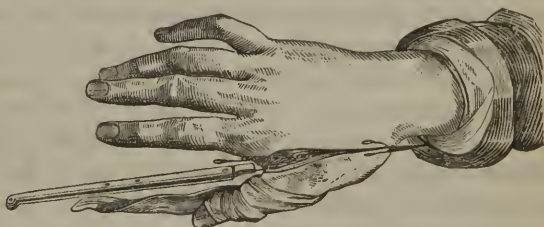
But little blood is lost in the removal of the finger; nor is it always necessary to take up the arteries.

The hemorrhage being arrested, the edges of the wound are brought together by adhesive straps, and a band carried around the hand, pressing the knuckles slightly together. The hand is placed in a sling. If inflammation threaten, cold water is applied.



The wound soon heals, and the hand becomes useful, leaving little disfigurement.

The phalanges of the thumb are removed in the same manner as those of the fingers.



Amputation of the Metacarpo-carpal Articulation of the Thumb may be performed by making an incision directly over the meta-

carpal bone, a little above its upper extremity, carrying it down to the space between the thumb and forefinger. The point of a long, narrow scalpel is introduced at the lower extremity of the incision, and the knife passed up under the metacarpal bone, and the point brought out where the incision began; the knife is carried downwards and outwards, making a flap of the proper size to close the part: the metacarpal bone is now disarticulated from the trapezium, and removed. Hemorrhage is arrested as in other cases; the wound is brought together by adhesive straps, and the hand placed in a sling.—(Liston.)

A better and more easy operation is to make an incision with a strong scalpel over the upper end and dorsum of the metacarpal bone, carrying it to the inner side of the thumb, around the palmar surface, and bringing it up on the outside, meeting the first incision; then dissecting out the bone from the under surface, and disarticulating the metacarpal bone from the trapezius: bring the wound together by adhesive straps, and place the hand in a sling.

Amputation of the metacarpal bone of the little finger is accomplished after the same manner as that of the thumb, the flaps being first formed before disarticulating the metacarpal from the unciniform bone.

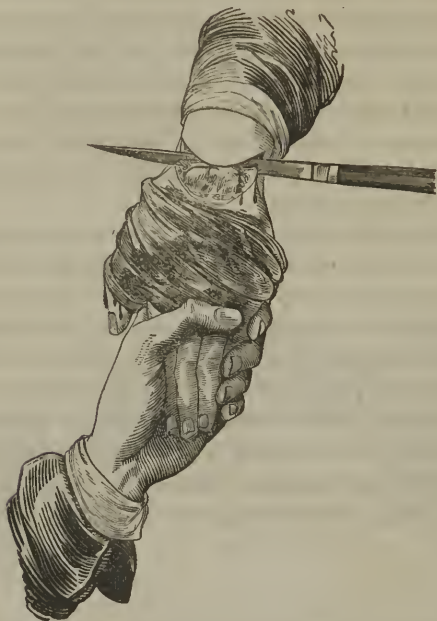
AMPUTATION AT THE RADIO-CARPAL ARTICULATION.

This may be performed either by a circular or double-flap operation.

Lisfranc has introduced another mode, which consists in passing a catling or double-edged knife across the anterior face of the wrist, from a point just below one styloid process to the lower edge of the other, and shaving downwards the surface of the wrist bones, so as to form an anterior flap; a semicircular incision is then made by puncture on the dorsum, and the flap thus formed dissected up; the knife is next passed under the styloid process of the radius, and swept along the curved line of the joint, so as to complete the disarticulation.

Liston performs the double-flap operation by making an inci-

sion of a semilunar form, with a small amputating knife, through the integument over the second range of carpal bones.



This flap is pulled back, and the joint opened; the lateral ligaments and tendons on the radial and ulnar sides are divided; a second flap, a little longer and more full, is formed by bringing the knife out in the palm.

The arteries are secured, and the parts brought together with adhesive straps, and cold applied, if necessary, to keep down inflammation.

In all the amputations of the fore-arm and arm, the brachial artery should be compressed, either by the fingers of an assistant or a tourniquet.

AMPUTATION OF THE FORE-ARM.

The fore-arm may be amputated either by a circular, single-flap or double-flap operation.

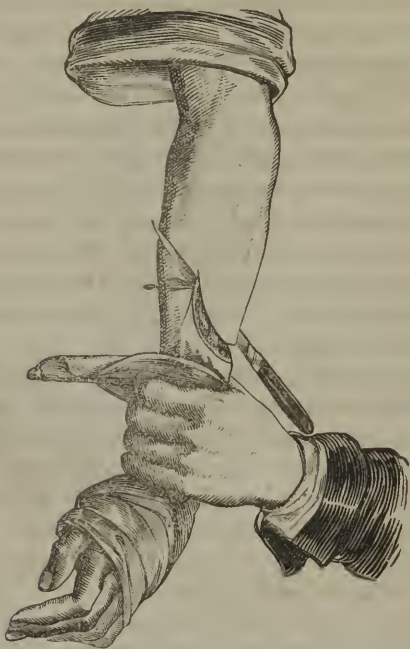
Circular Operation.—The amputating-knife is carried round the fore-arm, dividing the skin and subcutaneous cellular tissue, which is dissected up one-half the diameter of the limb, and turned over like the cuff of a coat; close to its fold the muscles are divided to the bone; a catling is passed into the interosseous space, dividing everything found there, and separating the muscles from the bones for some distance above the external incision; the middle tail of a three-tailed retractor is passed between the bones, and the soft parts being well drawn up, the bones are divided by a saw, which takes upon both bones at the same time. The part being removed, the arteries are secured by ligature, and the wound brought together by adhesive straps.

Single-flap.—Graefe, following the process of Verduin and Ruysch, passed the catling through from side to side in front of the bones and interosseous ligament, and cut out so as to form a semi-elliptical flap on the front part of the fore-arm; the skin and soft parts on the back were then divided down to the bone by a semicircular incision; the remaining muscular fibres and the interosseous ligament were then divided, the soft parts retracted, and the bone sawed in the usual manner.

Double-flap.—This is more frequently employed than the former, and is of easy execution. The flaps are generally made by cutting from within outwards; but Sir Charles Bell preferred to cut the flaps with a common amputating knife, from without inwards. He made his anterior flap much larger than the dorsal, and observed the precaution to divide the bones high up.

Mr. Liston performs this amputation in the following manner:—The limb being placed in a middle state, betwixt pronation and supination, the surgeon takes hold of the lower part with his left hand, whilst an assistant puts the integument on the stretch above. The posterior flap had better be made by cutting from without

towards the bones, the horns of the semilunar incision being made to project well upon the palmar aspect; transfixion is then made without raising the knife from the part, by passing the blade under the flexor muscles, close to the bones, from the termination to the point of the first flap.



In operating upon the left arm, the first incision is commenced on the radial side; upon the right arm, on the ulnar side. The flap having been completed and held back, the interosseous substance is divided, and the bones sawed together. In using the saw, the part to be removed is very slightly depressed, so that the instrument may not be locked. No retractor is required in this operation; the ligature of vessels, which will be easily found on the anterior flap, and the dressing, both primary and secondary,

are the same as already described and recommended for recent wounds in general.

AMPUTATION OF THE ARM.

The arm may be amputated either by the ordinary circular operation ; the double-flap, or by a circular cut going immediately through integument and muscle to the bone.

Circular Method.—The skin is drawn up by an assistant ; the brachial artery being compressed by the fingers of an assistant, or a tourniquet, as in other cases, a cut is made encircling the arm, dividing the integument and adipose membrane down to the fasciæ ; the integument is then dissected up half the diameter of the arm, and turned up like the cuff of a coat ; close to this fold, by one sweep of the knife, the muscles are divided to the bone, from



which they are dissected a short distance up ; a two-tailed retractor is applied, and the bone sawed off as high up as possible ;

the arteries are now secured, and the stump dressed as in former cases.

Double-Flap.—This operation is performed by Mr. Liston in the following manner. Anterior and posterior flaps are formed by transfixing the limb close to the bone; the object is to form both flaps as nearly as possible of the same length and dimensions, in every way; the anterior is to be made first, and with this view the point of the knife is entered on either the inner or outer aspect; it is then pushed to the bone, turned round its front surface, and the transfixion completed, leaving the vessels and nerves on the posterior part. By cutting downwards, and to the surface at the same time, a round and neat flap is produced.

The knife is then promptly entered on the other aspect of the bone through the same incision, about an inch lower than the point of transfixion, and a similar and corresponding flap forthwith cut out. These are retracted powerfully by an assistant, the first having been merely raised until the other was completed; the knife is made to revolve round the bone, so as to cut the muscles and clear a space for the application of the saw. The surgeon is so placed that he holds and commands the bone during the process of sawing, the fore-arm being supported by an assistant, and to guard still farther against accident, it is well to work the saw directed perpendicularly.

Circular method, without dissecting a flap from the integuments.—Draw up the skin as much as possible, and with the amputating-knife sweep an incision around the arm, about three inches below the point where the bone is to be sawed off, going directly through integuments and muscles down to the bone; dissect the muscles from the bone for about half the diameter of the limb, pass a two-tailed retractor, and saw off the bone as high up as possible: secure the arteries, bring the wound together with adhesive straps, and an excellent stump is formed. Apply cold dressings if necessary, as in other instances.

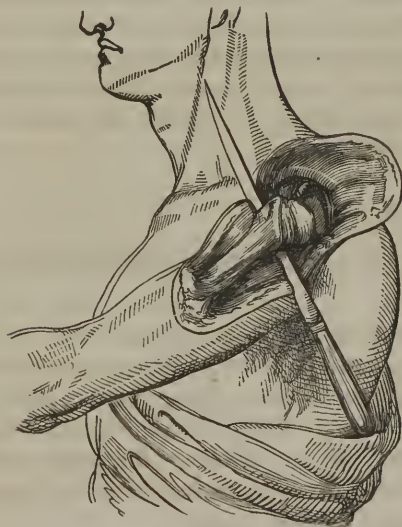
AMPUTATION AT THE SHOULDER JOINT.

The subclavian artery is compressed by an assistant as it crosses

the first rib, in the space above the clavicle, with his thumb, or with a boot-hook, or key, wrapped round with a piece of roller. For this amputation a knife of considerable length is used.

This amputation is performed either by a circular, single-flap, or double-flap operation. Sanson and Cornuau employ the circular method. Ledran employs the single-flap operation, making his flap from the axillary surface. Most other surgeons employ the double-flap operation.

The process of Lafaye, is to form a superior flap from the deltoid, by making a transverse incision down to the bone across the deltoid, five fingers' breadth below the acromion: two other deep incisions, nearly vertical, converging a little below like the margins of the deltoid, one on the internal and anterior surface, the other on the external and posterior, are dropped upon the extremities of the first. The flap is then to be dissected from the



bone and raised by an assistant, the capsule opened, and the head of the bone luxated upwards. The axillary artery is next to be

denuded and tied at the inner margin of the wound; the surgeon then brings down the knife so as to divide the soft parts on the interior of the bone upon a level with the fold of the armpit.

Grobois and Dupuytren, performed the same operation with slight modifications.

The process of Sir Charles Bell, is to form one superior and one inferior flap, which unite so as to make a transverse wound.

Lisfranc forms a posterior external and a posterior internal flap.

Liston's mode, in the right extremity, is to pass the knife from the anterior margin of the deltoid, about an inch below the acromion process, across the outer aspect of the capsular ligament, until its point appears within the posterior border of the axilla, and by drawing the instrument towards him, the operator makes quickly a full and rounded flap. The origins of the triceps and biceps, with the insertion of the infra and supra spinatus, are then cut through, and the joint is fully exposed and opened by one sweep of the instrument; the arm having been carried across the chest, the blade of the knife is passed behind the head of the bone, and carried close to it; an assistant follows the back of the instrument with his fingers and grasps the soft parts, while the inner flap is being safely completed. The arterics are tied and the wound dressed as in other cases.

AMPUTATIONS OF THE LOWER EXTREMITY.

Amputation of the Toes.—Amputation of the toes, and metatarsal bones are performed in the same manner as those of the fingers, and metacarpal bones. There is but one point of difference, that is, the necessity of saving the phalangeal extremities of the metatarsal bones; for the reason that the separation of the toes is no disadvantage, whilst the abutment furnished by the end of the metatarsal bone is of great importance.

Amputation at the Metatarso-Tarsal Articulations.—Make an incision across the dorsum of the foot, from the tarsal end of the metatarsal bone of the great toe to that supporting the little

one, or the proceeding may be reversed ; disarticulation having been effected, the knife is placed behind the head of the bones, and a flap of sufficient length is procured from the sole of the foot.



The formation of this flap in the first instance renders the disarticulation more easy, and simplifies the whole operative proceeding. A large bistoury is preferable to the catling, or small amputating-knife generally used. A rounded flap is made by cutting from the tibial to the fibular side, and vice versa, close to the roots of the toes ; it is turned back, and the two points, the commencement and termination of the first cut, are united by another incision carried across the dorsum in a semicircular form, and somewhat beyond the articulations to be opened ; the integument is pulled back, the cellular connexions being cut so as to permit full retraction ; the disarticulation is then completed with facility, the bones being forcibly bent towards the plantar aspect, more especially during division of the ligaments which bind the head of the second metatarsal bone. The vessels are tied, and the wound managed in the usual way.

It is important to save as much of the foot as possible ; therefore, when the condition of the parts does not require the amputation as high up as the metatarso-tarsal joint, the operation of Mr. Hey should be performed : this consists in making the flap as in the former instance, and dividing the metatarsal bones by the saw,

saving as much of their length as possible. The vessels are secured, and the wound treated as in former cases, and it cicatrizes as rapidly as when the bones are separated at the joints.

Amputation at the Tarsal Joint.—Chopart's operation, consists in the division being made in the line of articulation between the calcaneum and cuboid, astragalus and scaphoid bones. The surgeon places his left thumb and forefinger on the lateral projection of the scaphoid and cuboid bones, and divides, with a semicircular incision over the dorsum, convex forwards and half an inch in front of the joint, all the soft parts down to the bone. He then opens the calcaneo-cuboid joint, and the astragalo-scaphoid, by cutting their dorsal ligaments in succession. Pressing downwards the end of the foot, he next enters the point of the knife at the outer side of the joint, in order to divide the strong interosseous or calcaneo-scaphoid ligament, which forms the key of the joint. The foot, by first drawing it forwards, is now readily luxated upwards: the surgeon then carries the knife through the joint, shaves the tuberosities of the cuboid and scaphoid bones, and those of the first and fifth metatarsal, and cuts out, with the foot turned a little upon the edge, near the heads of the metatarsal bones, so as to form a large plantar flap. The vessels being secured, the wound is brought together and dressed as in former cases.

Amputation at the Ankle Joint.—Operation of Mr. Syme. A lunated incision is made across the instep from one malleolus to the other, and then the knife is carried in a semilunar direction along the sole of the foot, the points of both incisions meeting in front, a little below the malleoli, and, if necessary, a thin plate of the articular surface of the tibia. The tibial arteries, and such branches as may bleed, being secured, the hard tissue from the sole of the foot is brought up against the ends of the bone; union by the first intention is promoted, and the treatment generally is conducted in accordance with the ordinary doctrines of surgery. The principal feature of the operation is that of retaining the skin on the lower part of the heel to form the end of the stump, and as this is the part originally intended by nature for the body to rest upon, it is most likely that it will still form the very best, though the heel-bone is removed.

Amputation of the Leg.—The amputation of the leg may be effected either by the circular or flap method: the femoral artery being compressed by an assistant, or the tourniquet.

Flap Method.—*Process of Sedillot.*—Enter the point of the knife about three quarters of an inch to the outer side of the crest of the tibia, and carry it downward till it strikes the fibula; slide it round the outer face of this bone, bring it out at the posterior aspect of the leg, and cut from above downwards a flap three to four inches long: this is to be immediately raised by an assistant; detach the muscles for half an inch above the base of the flap from the tibia, fibula, and interosseous ligament. Unite the two angles of the incision by a circular division of the remaining parts, and dissect them up as far as the muscles have been detached: turn back this cutaneous and fleshy mass in the form of a cuff; cut sloping inwards the muscles on the internal and posterior face of the leg; divide the interosseous muscles, apply the three-tailed retractor, and saw the bones. After the arteries are tied, the flap is to be brought over the entire surface of the tibia, and attached to the integuments of the inner side with the twisted suture.

Process of Liston.—An assistant supports the affected foot, another puts the integuments above on the stretch, and is ready to hold back the parts during the incisions, and after they have been completed. When the right limb is the subject of operation, the point of the knife having been entered on the outside, behind the



fibula, is drawn upwards along the posterior border of that bone, with a gentle sawing motion for about a couple of inches; the

direction of the incision is then changed, the knife being drawn across the fore part of the limb in a slightly curved direction, the convexity pointing towards the foot; this incision terminates on the inner side of the limb, and from this point the knife is pushed behind the bones, and made to emerge near the top of the first incision; the flap is then completed, as here shown by the dotted line.

All this is done smoothly and continuously, without once raising the knife from the limb. The interosseous, muscular, and ligamentous substances are cut; the anterior flap is drawn back, and its cellular connexions slightly divided; both are held out of the way by the hands of an assistant, and the separation completed with a saw. In dealing with the left limb, the proceeding is very similar: the internal incision is not made quite so long, but it should still be practised, for a longitudinal opening of about an inch or more in extent, is more easily found in the transfixion, than the mere point at which the anterior incision is commenced. In sawing the bones of the left leg, the tibia may safely be cut first, as the surgeon commands the limb during the process, and can easily obviate the risk of snapping the fibula. The awkwardness attendant upon a change of position is thus avoided.

Amputation of the Thigh.—Both the circular and flap methods are employed in this amputation; the former principally in this country and the latter in Europe.

Circular Method.—The femoral artery being compressed by the fingers of an assistant, a tourniquet, or the pressure of a covered key; the circular amputation of the thigh is performed precisely in the same way as that described for the arm.

Flap Method; by two lateral flaps.—These may be made by transfixion from the anterior to the posterior part, and cutting out to the surface, as practised by the French surgeons, or they may be raised by incisions in the opposite direction, cutting from the skin towards the bone, after the manner of Langenbeck. Which-ever plan is adopted, the operation is performed in the manner described for the arm; it is not necessary therefore to repeat the description.

In the operation by two lateral flaps, there is a strong tendency

(which by great care in dressing may partially be obviated) in the end of the bone, to approach too near the anterior angle of the wound, partly from its rising upwards under the action of the muscles inserted in the trochanter minor, and partly from the retraction of the posterior margins of the flaps towards the hip. For these reasons, preference is commonly given, in this country and in Great Britain, to the formation of flaps in the opposite direction.

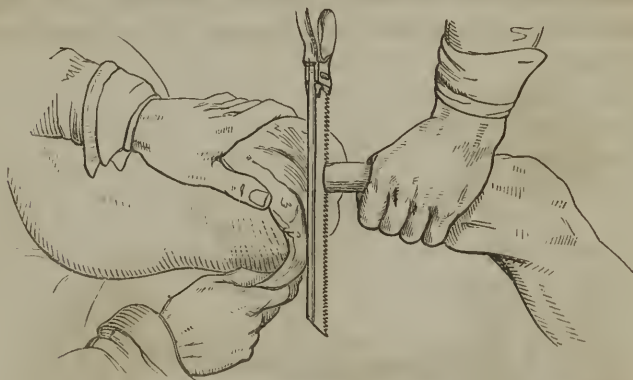
Anterior and Posterior Flaps—Process of Liston.—The instruments should be previously laid out on a tray, and covered with a cloth. They consist of a long, narrow, blunt-backed, and sharp-pointed knife; a plain, good, and serviceable saw; a pair of dissecting forceps, and a pair or two with a catch: also, a pair of bone-nippers, in case there should be any splintering of the bone, but it is the operator's fault if this happens. The surgeon places



himself on the tibial side of the right limb, on the fibular side of the left; everything being ready, he lays hold of the soft parts on the anterior aspect of the bone, lifts them from it, enters the point of his knife behind the vena saphena, in operating on the right

side, passes it horizontally through to the bone, carries it closely over its fore part, and brings out the point on the outward side of the limb, as low as possible: then, by a gentle and quick motion of the blade, a round anterior flap is completed.

The instrument is again entered on the inner side, a little below the top of the first incision, passed behind the bone, brought out at the wound on the outside, and directed so as to make a posterior flap, in the direction of the dotted line, a very little longer than the former. The anterior flap is merely lifted up after it is formed; but now that both have been made, they are drawn forcibly back, whilst the surgeon sweeps the knife round the bone, so as to divide smoothly the muscles by which it is immediately invested. The bone, grasped by the left hand, is sawed close to the soft parts, the



saw being directed perpendicularly. The femoral artery found on the posterior flap, is tied along with other vessels, and the stump is treated as recommended after other amputations. After a lapse of six or eight days, or sometimes earlier, a roller should be applied and made to embrace the whole face of the stump, in order to cause reduction of any œdematous swelling that may remain, and bring the parts into a good form. This is the only interference with the part after the first dressing, and is unattended with pain. When the light and easy mode of dressing is followed, the fever and discharge are but trifling, and the period of recovery is considerably abridged.

Amputation at the Hip Joint.—This operation may be performed either by the circular method, as proposed by Abernethy, the oval process of Cornuau, or the double flap.

Flap Operation—Process of Liston.—By forming the flaps from the anterior and posterior aspects of the limb, the bone may be exposed and sawed at the inner trochanter, or it may be removed at the joint. In making the incision thus high, the common femoral is compressed, as it passes over the brim of the pelvis, and an assistant must follow the knife with his hand, and grasp firmly the anterior flap, whilst others are ready to compress the vessels in the posterior, so soon as the sawing or disarticulation is completed.

These operations must be undertaken with determination and completed rapidly, in order that dangerous effusion of blood may be prevented; they are not to be attempted without great consideration, and only under very pressing circumstances.

The fore part of the articulation is fully exposed immediately on the anterior flap being formed.



The capsular ligament is cut by drawing the knife across determinately, as if it were the intention of the operator to cut off the head of the bone. The round ligament and the posterior portion of the capsule are cut; and the blade of the instrument having been passed behind the neck and trochanters, the posterior flap is quickly formed, so as to allow the limb to drop. The vessels on the posterior aspect are first tied; then the femoral, and those in

the anterior flap, which had been commanded by the assistant, are uncovered one by one, and secured.

Process of Lisfranc.—The flap may be first formed by transfixion and cutting outwards, then opening the joint and carrying the knife around the bone, so as to divide transversely, or with such obliquity as the state of the parts will allow, the tissues on the opposite surface of the limb. Or an incision may at once be made on the outer side of the thigh, so as to expose the joint, and terminate near the tuberosity of the ischium, the joint opened from the outer side, and the flap cut last upon the anterior and inner face of the limb.

THIRD DIVISION.

Splints and Bandages—Fractures—Trephining—Compound Fractures—Pseudo-Arthrosis—Dislocations or Luxations—Subluxation of the Humerus—Separation of the Symphysis Pubis—Compound Dislocation of the Ankle-Joint—Subluxations and Sprains of Joints—Rupture of Muscles and Tendons.

SPLINTS AND BANDAGES.

It is impossible to treat fractures, or indeed any surgical disease, properly and with success, without great care, practice, and skill in the application of bandages and the variety of apparatus employed for these purposes. In regard to fractures, it is positively indispensable to possess skill in the application of apparatus, and without which no one should presume to treat a case. Therefore the greatest attention should be paid to the acquirement of this skill, which can only be done by practice and frequent handling of the appropriate apparatus for whatever case may present itself. There is little utility in trying the thousand forms of bandages and machines ingeniously made and recommended for use, or to experiment with the older curiosities of the many-tailed bandages. The bandages and splints employed should be those that are especially called for by the indications of the case; and the surgeon who is best fitted to practise his profession is he who is least dependent upon the mechanic, but on the contrary can find within his own resources all that may be required to correct any case that may occur. Thus, little more is necessary in the treatment of most fractures than simply muslin and light board. I will, therefore, when treating of fractures and dislocations,

recommend the most efficient, and consequently the most simple apparatus, such as can be made at the moment, avoiding all fancies, and useless bandages and patent splints. These last, when desired, have directions for their use accompanying them.

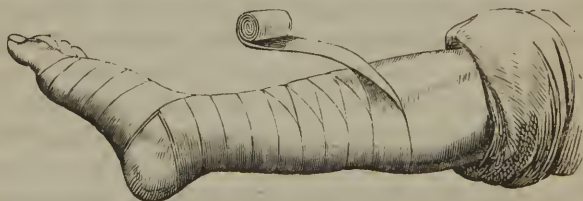
FRACTURES.

The *exciting causes* of fractures are mechanical violence and muscular action. Mechanical violence may be *direct* or *indirect*. It is direct when the fracture is produced at the point to which the force is applied. It is indirect when the force is applied at one point, and the fracture occurs at another.

The *predisposing causes* of fractures are old age, mollities ossium, fragilitas ossium, and original brittleness.

Treating upon the application of bandages, Mr. Fergusson remarks: "For whatever object a bandage is applied, whether in the treatment of ulcers, of varicose veins, or of fractures, it is of importance to observe that an equal amount of support or pressure is afforded on all sides.

"In bandaging the leg, the following method should be pursued. The end of the roller should be laid on the anterior part of the metatarsus, and two or three turns should be made upon the foot as high as the instep. Next a turn should be made round the leg immediately above the ankle, and round the foot again over the instep. As it is seldom thought requisite to cover the heel completely, the bandage may now be carried up the leg, turn after



turn, until the limb is enveloped as high as the knee, or as far as may be required, each turn of the cloth being made to cover a

third or more of the preceding; and as the swell of the calf increases, the roller should be reversed or folded downwards, for by such a movement the pressure is equally diffused over the surface, and thus no inequalities will be perceived when the bandage is removed, but it will be seen that an equal support has been given to the surface throughout. The method of applying a bandage is easily demonstrated on the body, but cannot be so readily described. The preceding drawing will probably serve to make my description clearer. The roller may be held either in the right hand or the left, and carried from the right side of the leg or the left, at the will of the surgeon, as seems best fitted to the circumstances."

After the occurrence of fracture in some persons, without assignable cause, fibrin is effused into the cellular tissue around the fractured part. In two or three weeks the fibrin forms a kind of cartilaginous capsule, and adheres closely to the bone, both outside and in. In the course of two or three weeks more this ossifies, and becomes *provisional callus*, and the use of the bone is restored. But the fractured extremities of the bone are not yet united by ossific matter: their union requires five or six months. Whilst this is taking place, the "provisional callus" has been removed, its support being no longer needed. There are certain bones which seldom unite by bony union, but on the contrary are connected by ligamentous or fibro-cartilaginous matter, as the bones of the cranium, a portion having been removed,—the olecranon, patella, and cervix femoris.

Fractures occur in three directions, as *transverse*, *oblique*, and *longitudinal*.

There are several varieties of fractures, viz., *simple*, *compound*, *comminuted*, and *complicated*.

A simple fracture is a solution of continuity in the osseous tissue at one point, without external injury to the soft parts.

A compound fracture is a solution of continuity in the soft parts and osseous tissue, with an external opening.

A comminuted fracture is where the osseous tissue is separated at several points, or crushed, thus producing many fragments of bone. It may either be simple or compound.

A complicated fracture is one in which the fracture is accompanied with luxation of a joint, laceration of large vessels, rupture of ligaments and tendons, or gun-shot wound.

The *danger* from simple fracture is inconsiderable; but from the other varieties it is often extreme, and may terminate fatally in a few hours, from loss of blood and shock to the system, or from inflammation, fever, tetanus, and typhoid fever or hectic, dependent upon excessive suppuration.

The *question of amputation* is always one of great importance, and often of perplexity, in compound fractures.

Amputation is generally called for when, added to the other injuries, the principal vessels and nerves of the limb are torn across, or the bone much shattered and comminuted. If a large joint, especially the knee-joint, be opened, if the soft parts be torn to such an extent that the wound cannot be closed, or if they be so injured that a large tract must necessarily slough, or if the collapse resulting from the injury be permanent and excessive, amputation may probably be required. In these doubtful cases, the age, habits, and constitution of the patient have an important bearing; for if he be young and healthy, or old and of good habit and fine constitution, more should be risked in attempts to save the limb than when the opposite of these conditions are met with.

If it be necessary to resort to amputation, it should be performed before the accession of inflammation and fever.

FRACTURE OF THE CRANIUM.—In fracture of the skull there may be *simple fissure* of the bone, or *fracture with depression*, or the *outer table* alone may be fractured and driven into the diploe. This can only occur in middle age, since the diploe does not exist in infancy nor old age. The inner table alone may be fractured. Generally both tables are broken, and the bones are sometimes split to a very great extent.

Diagnosis is not difficult in these cases. They are the result of great violence; and when the seat of fracture is upon the surface it can be felt by the finger, which should be passed into the wound, if there be an opening in the scalp. If the patient be not seen until the hard puffy tumour has formed upon the scalp, the exact nature of the injury cannot be ascertained until this subsides. It should

be remembered that, although the fracture generally occurs at the seat of the injury, yet it often takes place at the part of the arch most distant from the application of the force. Thus, a blow or fall upon the top of the head may, and often does produce fracture of the *base of the skull*. This injury may be recognised by the escape of blood from the ears, nose, and mouth, (caused by tearing the sinuses of the dura mater,) with early and severe symptoms of compression of the brain, and after the lapse of some days a discharge of watery fluid from the ear, (thought to be due to the escape of serum from the sac of the arachnoid membrane.) In fracture with depression, there are symptoms of compression; yet these symptoms accompany fracture without depression of bone, where there is effusion of blood or accumulation of pus upon the brain. Crepitation can be felt when there are detached fragments of bone. Symptoms of concussion are observed in simple fracture, as well as in more serious cases, preceding the more dangerous symptoms of compression.

Prognosis is always doubtful in these cases, and generally unfavourable.

Treatment.—The general treatment should always be actively antiphlogistic, with the free use of the lancet, one of the greatest dangers being inflammation of the brain and its membranes. In fracture without depression, where the scalp is torn, it should be adjusted and retained by suture, bandage, or adhesive straps: the last is probably the best means. In all cases of this kind, first shave the entire scalp, or at least a large space around the seat of injury, and treat the wound so as to prevent inflammation. The application of cold water, with perfect quiet, is one of the best modes of accomplishing this end. In all these cases symptoms of compression should be looked to and guarded against. In fracture with depression of bone, accompanied with compression of brain, it is necessary to relieve the patient by the use of the trephine; the elevator can scarcely ever operate advantageously until the trephine has made a good point for its application. Another great advantage in the trephine is that of giving egress to the blood escaping from the wounded vessels. Even where symptoms of decided compression have not yet supervened upon depression of a

fragment of bone, it has been advised to elevate it, provided the danger of inflammation and compression seem urgent, or almost certain to occur from the presence of the foreign body; and it is both reasonable and good practice. But the trephine should not be resorted to because there is some depression and slight symptoms of compression manifest; constitutional treatment, with the application of cold to the head, and quiet, should be the means looked to for relief. The trephine has also been employed successfully in relieving the brain from compression by accumulation of pus and effusion of blood.

In the application of the trephine it is generally advisable to avoid the sinuses and the meningeal artery. The most advantageous point near the seat of mischief should be selected for the operation, and great care taken, upon approaching the inner table of the cranium, to avoid wounding the membranes of the brain. If the integuments be not sufficiently divided by the accident, an incision must be made through them, sufficiently extensive to allow the free application of the trephine. Either of the following forms of incision may be made for this purpose, and the flap raised by a scalpel.



In cases of comminuted fracture of the cranium, where fragments of bone are detached, they have become foreign bodies, and should be removed. In fractures of the cranium generally, however, little can be done with the fracture: the main points in the case are compression and inflammation; these must be guarded against, if possible. Non-interference with the seat of injury is the best general rule that can be given.

FRACTURE OF THE NOSE.—Fracture of the nose is ordinarily a very simple accident, but may be dangerous by great violence being applied to the bones of the nose, and through them breaking the cribriform plate of the ethmoid bone, and forcing it in upon the brain. Ordinarily there is mere fracture of the nasal bones, which is easily recognised by the deformity produced.

Treatment.—The bones should be readjusted by pressure upon the outside with the fingers, and from within by a director or other convenient means, and cold water applied to reduce the tumefaction and inflammation.

FRACTURE OF THE LOWER JAW.—*Fracture of the Inferior Maxillary Bone* is of frequent occurrence, and is always the result of



considerable force: it is generally broken in the mental region, or the middle of the horizontal ramus. In children it sometimes takes place at the symphysis, but fracture may occur in any part of the lower jaw.

Diagnosis is very easy in this injury: the anterior fragment is drawn downwards; there is pain on moving the jaw, crepitus and irregularity in the teeth and alveoli.

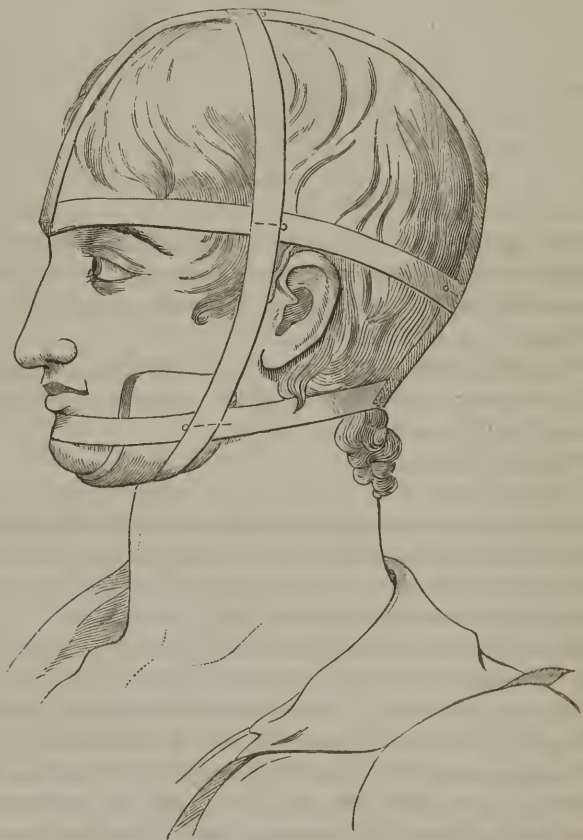
Prognosis is favourable.

Treatment consists in coaptating the fragments and securing rest by pressing the teeth (which make an admirable splint) firmly together, and securing the part by the application of a piece of pasteboard, or a compress of linen applied under the jaw, and secured by one of the following bandages.

The Four-tailed Bandage is probably the best that can be applied. It is made of a piece of muslin about four inches wide, and one and a half yards long: this is torn longitudinally at both ends, leaving eight inches in the middle entire; in the centre of this a slit is made, to allow the chin to pass through; the two ends of the lower half are carried up the side of the face, and tied on the top of the head; the remaining ends are carried around the neck and fastened behind, the bandage being so arranged as to embrace the chin and keep the jaws firmly applied to each other. This band-

age is more firm, and sets better, when long enough to pass several times around the face and neck.

Dr. Gibson's bandage consists in a roller an inch and a half wide. This is passed in circular turns under the jaw, up the face, and over the head several times; it is then pinned at the temple and turned at right angles, encircling the back of the head and forehead by several turns; it is pinned again at the temple, and



carried down the side face and pinned on a line with the chin; carried then at right angles, several horizontal turns are made

embracing the chin and back of the neck. A strip of roller is then carried over the top of the head and pinned to the several turns, to secure the bandage from slipping.

Dr. Rhea Barton's bandage is one of the simplest and best that has been recommended. It consists in a narrow roller, the initial end of which is to be placed under the occipital protuberance; the bandage is carried over the right parietal bone, obliquely across the coronal suture to the left temple, down the left side-face, under the jaw, up the right side-face, and obliquely over the coronal suture to the left ear (above it), being carried around under the occipital protuberance to the right side, then passing under the ear, is carried around the chin, embracing the neck and chin by a circular turn; it is then carried on under the occipital protuberance, over the right parietal bone, and again obliquely over the coronal suture to the left temple, and continued in these turns until expended.

With each of these bandages it is necessary to have the compress or wet pasteboard well adapted to the jaw. The patient must be supported by sucking liquids, the teeth always leaving sufficient space for this purpose. When the position of the fracture makes it practicable, it is a good plan to bind the teeth together at the seat of fracture, by passing a silk ligature around them.

FRACTURE OF THE SCAPULA.—Fracture of the scapula, in its body, occurs from great violence directly applied.

Diagnosis.—In this injury there is but little displacement. Voluntary motion is impaired; the part is swollen and painful. By placing the hand flatly upon the seat of injury, and communicating motion to the scapula, crepitus can be felt.

The *Treatment* of this injury consists in restraining motion by passing a roller around the thorax, so as to bind the scapula firmly to it, and placing the hand in a sling.

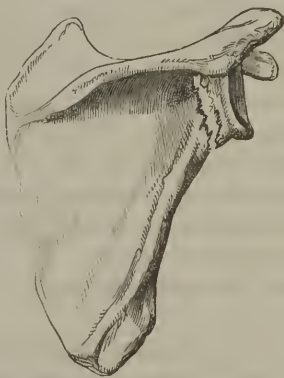
FRACTURE OF THE ACROMION PROCESS is caused by direct violence.

Diagnosis.—It may be recognised by flatness of the shoulder, the fragment being drawn downwards by the deltoid muscle. The clavicle and broken fragment are drawn downwards and forwards by the action of the subclavius, deltoid, and pectoralis major muscles. By forcing the head of the humerus upwards against the

acromion process crepitus can be felt, whilst rotation of the arm does not cause crepitus.



The *Treatment* consists in elevating the humerus, thus making a splint of the head of the bone, which keeps the broken parts in apposition. The arm should be maintained in this position by the application of the apparatus for fractured clavicle, without the wedge-shaped pad, the indication in fracture of the acromion being merely to raise the arm.



FRACTURE AT THE NECK OF THE SCAPULA.—In this accident the broken fragment consists of the glenoid cavity and coracoid process.

Diagnosis.—Much care is necessary to distinguish this accident from dislocation. The fractured portion of the scapula is retained in contact with the head of the humerus by the long heads of the biceps and triceps muscles: the head of the humerus, with the detached fragment of the scapula, is drawn downwards and forwards into the axilla by the subscapularis, pectoralis major, and latissimus dorsi muscles. There is flatness of the shoulder, prominence of the acromion, with a vacancy beneath it; the limb is somewhat lengthened, and the head of the humerus lodged in the axilla, as observed in cases of dislocation of the head of the humerus. But, by very gentle effort, the head of the bone may be replaced, and the deformity disappears. When support to the part is withdrawn, the displacement and deformity reappear, which is not the case in dislocation. Crepitus may also be distinctly felt by placing the thumb on the coracoid process (which can be readily felt under the outer end of the clavicle), and pressing the fingers in the axilla; then, by pushing the arm upwards and outwards, signs of fracture, not to be mistaken, are made evident.

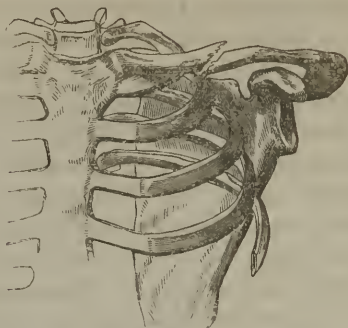
Treatment of fracture of the neck of the scapula consists in coaptating the broken fragments, and keeping the parts at rest. For this purpose the apparatus for fractured clavicle is probably the best, and should be applied so as to arrest both the movements of the arm and scapula: here the wedge-shaped pad meets one of the most important indications.

The *coracoid process* and *articular surface* of the scapula are occasionally fractured; but it is not of frequent occurrence. When these accidents are met with, the fore-arm should be placed in a sling, and the part kept at rest. M. Velpeau's bandage for fractured clavicle answers the indications for fracture of the coracoid process of the scapula better than any other.

FRACTURE OF THE CLAVICLE.—Fracture of the clavicle is of very common occurrence. It usually takes place near its middle, and is generally oblique. It is the result of force applied either directly or indirectly.

Diagnosis in this case is perfectly easy. By passing the finger along the clavicle, the natural line of the bone is observed to be interrupted, and the broken extremities perceptible: the shoulder

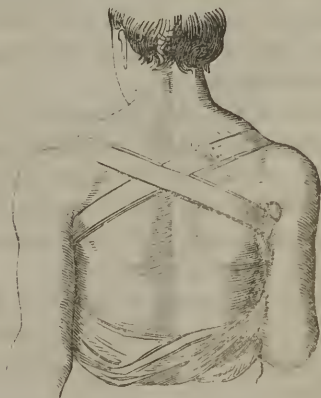
falls forward and inwards; the outer fragment is drawn downwards by the action of the subclavius and deltoid muscles. By pressing



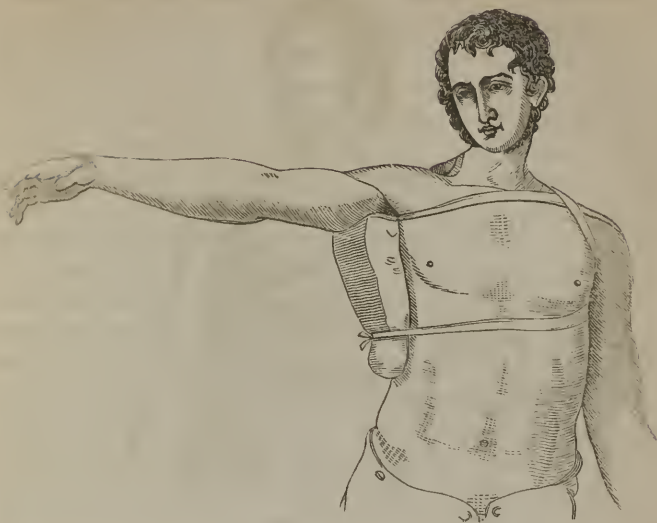
the shoulder upwards and outwards crepitus can be felt at the point of separation.

Treatment of fractured clavicle consists in adjusting the broken extremities of the bone by forcing the shoulder *upwards, outwards, and backwards*, and retaining it in this position.

The following apparatus is employed for this object. A padded belt is placed around each shoulder, and drawn together on the

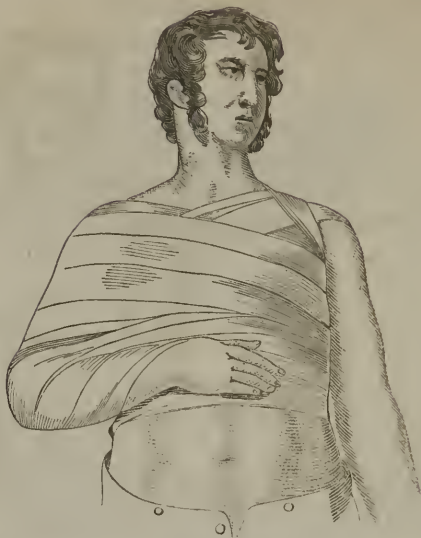


back by a strap, and the fore-arm placed in a sling: or a folded towel is placed in the axilla, and a bandage is passed from shoulder to shoulder, forming a figure of 8 across the shoulders. This plan is recommended by Mr. Fergusson. Mons. Desault's apparatus con-

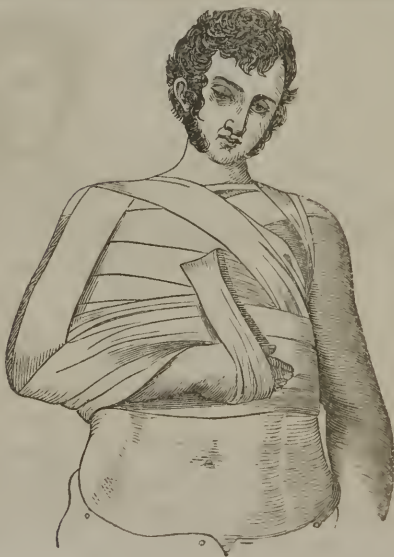


sists in a wedge-shaped pad and three rollers : the base of the pad is placed in the axilla, and secured to the body by passing a roller





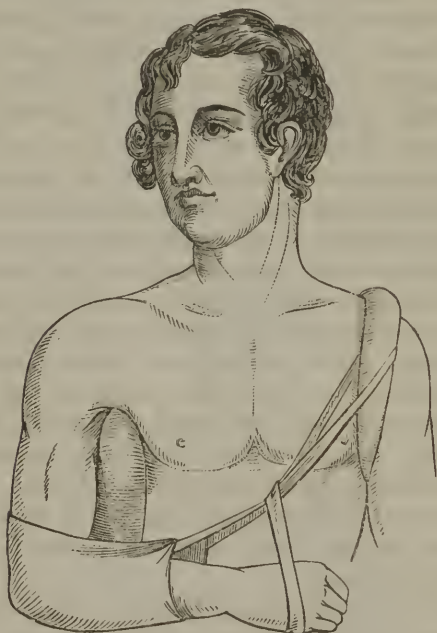
in circular turns around the chest. The fourth and fifth turns of the bandage are carried over the sound shoulder and under the



arm-pit. The arm is now brought down upon the pad, which acts as a fulcrum, and the fracture adjusted: the fore-arm is placed across the chest. The second roller is now to be applied, by placing the initial end in the axilla of the sound side, and carrying it to the shoulder of the injured side, around the body; then continue, by circular turns, binding the arm to the pad from the shoulder down below the elbow. A compress of muslin is placed upon the injured part, and the third roller is commenced at the arm-pit of the sound side, and carried obliquely over the shoulder of the injured side, down the back of the arm, under the elbow, across the chest, under the arm-pit of the sound side, across the back, over the injured clavicle and down in front of the arm, under the elbow, obliquely across the back to the arm-pit, and continued, forming a triangle in front and behind, until exhausted: the hand is then placed in a sling. M. Velpeau's treatment consists in placing the hand of the injured side upon the acromion process of the sound side; the end of a roller is then placed at the axilla of the sound side, and carried across the back over the fractured clavicle, down and obliquely across the arm, under the elbow, obliquely upwards to the axilla of the sound side, then under the arm to the back, and these turns are continued three or four times; the same number of circular turns are then made, embracing the arm of the injured side and chest; this is continued until the injured side is wholly covered. Another bandage, well saturated with dextrine, is now passed over this, in the same manner as the first, which forms an immovable sac. To prevent excoriation, M. Velpeau says it is well to place two thicknesses of linen between the arm and chest, and to put compresses upon the clavicle. When this bandage is employed for fracture at the neck of the humerus, he recommends a pad to be placed in the axilla, about one-half less than that of M. Desault.

The last and best apparatus, is that of Dr. Fox, which consists in a sling for the elbow, made of stout linen, or other material; this should be in length about two-thirds of the fore-arm, and deep enough to embrace the fore-arm; it can easily be made out of a piece of stuff, cut into a parellelogram twice the width of the fore-arm and two-thirds of its length; this is to be doubled in its

shortest diameter, and one end sewed up ; at the upper angle, and the corner of each side, a strong loop of tape is attached. A ring of linen, stuffed with earded cotton, is made to embrace the shoulder and axilla ; a wedge-shaped pad, which should be three inches thiek at the base, six inches long, and four or five wide ; three strong pieeces of tape or bandage complete the apparatus. The application of it is as follows : the base of the pad is placed in the axilla of the injured side, and temporarily secured by being held, or by tapes tied around the neck ; the arm of the sound side is passed through the padded ring, which rests in the axilla and over the shoulder : the sling is applied to the fore-arm, the elbow



placed firmly in its angle, and the arm is now brought down to the side, the fracture coaptated, tapes having been passed through the loops attached to the sling, are now carried through the ring at the sound shoulder, the tape at the elbow carried behind the

chest, and those at the wrist in front; these are firmly drawn so as to place the shoulder and clavicle in proper position, the hand being put into a sling. Raw cotton should be placed under the tapes where they touch the skin to prevent excoriation. With this apparatus I have treated a child only twenty months old without inconvenience or deformity, but it is necessary to avoid much pressure in such young subjects, as well as to exercise great care in protecting the skin from excoriation; in this case a few circular turns of a roller was passed round the chest and fore-arm to prevent motion; an addition unnecessary in the adult. This apparatus is easily applied, and can be worn without inconvenience, and probably answers the indications better than any that has yet been proposed; and wherever the use of the apparatus for fractured clavicle is herein recommended, in other cases, it is this last to which reference is made.

FRACTURE OF THE STERNUM.—Fracture of the sternum is generally transverse, and the result of great violence, so that the injury done to the thoracic contents, is often of more moment than the fracture.

Diagnosis is readily made in this case; there is deformity by displacement, and crepitus during respiration.

Prognosis is unfavourable in fracture of the sternum, from the probability of inflammation and suppuration in the thorax, with caries of the bone; this accident often results in death.

Treatment of the fracture consists in passing a roller around the chest to arrest its motions; inflammation in the thorax must be combated by antiphlogistic means; carious portions of the bone can be removed by Hey's saw, bone-nippers, and forceps; but aid in this way should not be rendered too officiously, lest harm instead of good result. The trephine has been successfully used in evacuating collections of pus in the anterior mediastinum.

FRACTURE OF THE RIBS.—Fracture of the ribs is generally transverse, and may be produced by direct force, or by violence applied at their extremities; in the former instance, the displacement is internal; in the latter, external.

Treatment in these cases consists in lessening the respiratory motions of the chest, by passing a roller around the thorax, and

causing the patient to breathe by the action of the diaphragm. If there be internal displacement at the point of fracture, pressure should be made upon the extremity of the rib, by placing a compress upon it, and binding it down firmly by the bandage; if the angular displacement be external, the compress should be placed upon the point of fracture. If inflammation of the thoracic contents supervene, or the lungs have been wounded, these indications must be met by the appropriate means in such cases.

FRACTURE OF THE SPINE.—Fracture of the spine rarely occurs, but when it does, it is always the result of great violence.

Diagnosis in fracture of the spine, is not always easy; in some cases paralysis of the lower extremities occurs from violent concussion of the spine without fracture.

In fracture of the spine, above the *fourth cervical vertebra*, death follows almost instantly, from injury to the phrenic nerve.

In cases of fracture *below* the *fourth cervical vertebra*, there is paralysis of the upper extremities, with difficult respiration, and death occurs in four or five days.

When the *dorsal vertebræ* are the seat of the fractures, there is paralysis of the lower extremities and torpor of the intestines; the abdomen is frequently enormously distended by air contained in the intestines. Death usually occurs the third or fourth week.

In fracture of the *lumbar vertebræ*, the bladder and rectum are paralysed, and the urine and *fæces* pass involuntary; the lower extremities are paralysed and insensible to stimulants, but retain their heat and circulation undiminished. Death follows, at latest, in five or six weeks.

Fractures of the *spinous processes* of the *vertebræ* are not followed by serious consequences, unless accompanied by concussion or some other injury.

Prognosis in all cases of fracture of the *vertebræ* is unfavourable.

Treatment in these cases consists in little more than enjoining rest, combating inflammation within the sheath of the spinal marrow, and drawing off the urine frequently. Effusion of blood and suppuration often occur along the tract of the spinal marrow and in its sheath.

FRACTURE OF THE PELVIS.—Fracture of the pelvis occurs only from great violence ; the displacement is not great, and little can be done to remedy it ; the injury sustained by the soft parts within, is of more interest than the fracture.

Prognosis in this fracture is always unfavourable, for when the fracture is extensive, death usually follows ; and when the injury is less severe, inflammation and abscess result ; making the case tedious and doubtful.

Treatment consists in rest, placing a broad bandage around the pelvis, in combating inflammation, and correcting, as much as possible, the injury done to the pelvic viscera. A remote danger arises from inflammation and abscess.

In fractures of the *os pubis*, *coccyx*, and *ischium*, by passing the finger into the vagina or rectum, the fragments may be adjusted ; but low diet, rest, and antiphlogistic means must be principally relied on in injuries of this nature.

FRACTURES OF THE UPPER EXTREMITIES.

FRACTURE OF THE HUMERUS.—Fracture of the humerus may occur in any part of the bone, but its middle is oftener the seat of fracture than any other point.

The *surgical neck* of the bone is sometimes the seat of fracture. (The surgical neck signifies a point without the capsular ligament, just below the tuberosities of the bone.)

The *condyles* are also liable to be broken off obliquely, by force directly applied ; one or both may be fractured at the same time.

Diagnosis in fracture of the *shaft* of the bone, is quite easy. There is pain and incapability of using the limb, which is the case in all fractures ; the line of direction of the bone is altered, consequently deformity of the limb exists ; by fixing the upper fragment with one hand, and rotating or moving the lower with the other hand, crepitus can be felt.

Fracture of the *neck* of the humerus generally occurs in old subjects ; this accident has often been mistaken for luxation, and a little care is necessary to avoid this error. In fracture, the

natural form and roundness of the shoulder-joint is unaltered, because the head of the bone remains in the glenoid cavity, and



by taking hold of the elbow, and rotating, or moving it, crepitation is distinctly perceptible.

The *condyles* are often fractured, and sometimes have been falsely diagnosed for luxation of the radius and ulna backwards. Fracture may be distinguished by crepitation, induced by moving the fragments one upon the other; also, by pressure upon the olecranon and bend of the arm, increasing the width of the elbow, when both condyles are fractured.

The *head* of the humerus is sometimes fractured by direct violence, or by gun-shot wound.

Prognosis is favourable, except in fractures of the condyles; in these cases, inflammation and ankylosis are apt to follow the injury; still, excellent cures are frequently made.

TREATMENT OF FRACTURES OF THE ARM.—Treatment of fracture of the shaft, consists in coaptating the broken bone, by extension from the wrist or elbow; the application of a

roller by circular and reversed turns from the hand to the shoulder; four wooden splints, nearly a quarter inch thick, shorter in length and breadth than the humerus, the inner one being the shortest, and placing one upon each side of the arm, and binding them firmly over the fracture with the remainder of the roller; place the fore-arm in a sling across the chest. It sometimes happens that the bandage on the fore-arm causes swelling and pain; where this effect is produced, commence the roller just above the elbow, bandaging the arm only, leaving the fore-arm bare, and slinging it, as in the former case.

FRACTURE OF THE NECK OF THE HUMERUS should be accurately adjusted, and Fox's apparatus for fractured clavicle, or any other suitable apparatus applied,—the wedge-shaped pad forming the best possible support to the inner side of the separated bone. If in any case additional support be found necessary, the leather splint of Mr. Liston should be applied, or a roller passed around the arm and thorax, binding the former firmly to the pad; the elbow should not be as forcibly raised in this case as in fractured clavicle. The secret of cure without deformity, in this injury, is in getting a firm, well-fitting pad in the axilla, high up, so as to bear upon, and firmly support, the fragments.

Desault's apparatus consists in passing a roller from the fingers to the shoulder by circular and reversed turns; arriving at the shoulder, the bandage is carried across the breast, around the shoulder and arm-pit of the sound side, and across the back to the shoulder of the injured side; three splints, two inches wide, and the length of the arm, are now placed on the anterior, posterior, and outer parts of the arm, and the roller passed firmly over them in circular turns to the elbow, placing cotton, tow, or lint under their extremities, to prevent excoriation; the wedge-shaped pad is fixed in the axilla, the injured arm brought down upon it and secured by passing around the chest and arm, his second roller for fractured clavicle; the fore-arm is then placed in a sling.

Mr. Liston recommends the following apparatus for injuries about the shoulder joint and clavicle, and says: "The separate bandaging of the fingers, hand, and fore-arm, for this purpose, the position of the pads, the mode of fixing the shawl which contains

the wedge-shaped axillary cushion, and the bandage surrounding the chest, are here exhibited. In bandaging the hand, a pad of



lint is first placed on the palm to fill up the hollow where the bandage would probably exert no pressure. A sling completes the apparatus for all the injuries of the clavicle and shoulder-joint." He also recommends a leather splint in these cases. "If the fracture have occurred in the upper end of the bone, betwixt the insertions of the tendons of the latissimus dorsi, pectoralis major, and deltoid, then a leather splint may with advantage be applied from over the shoulder joint to the point of the elbow. A piece of skirt-leather, (as it is called by saddlers,) dressed without oil, is cut so as to fit the limb; it is soaked and softened in warm water, and then applied and retained by a roller. It soon becomes a firm mould to the limb; it can then, after its edges are well pared and rounded off, be stuffed with wadding, or lined with wash-leather, and thus forms an excellent support and protection to the injured part."

FRACTURE AT THE ANATOMICAL NECK OF THE BONE, (which is above the tubercles,) occurs sometimes in young subjects. The articular head of the bone is also the seat of fracture; but both

of these accidents are rare, and do not differ in management from the former case.

FRACTURE OF THE HUMERUS, occurring above the insertion of the deltoid and below the insertions of the pectoralis major, latissimus dorsi, and teres major, requires some care to prevent deformity; for the lower fragment is drawn forcibly outwards by the action of the deltoid muscle, whilst the upper fragment is drawn strongly inwards by the latissimus, teres, and pectoralis major.

The treatment consists in reducing the fracture by extension of the arm, the application of splints to the fore, outer, and back parts of the arm, and the nice adjustment of a wedge-shaped pad to the axilla, so as to pass high up, and give even and firm support to both fractured extremities of the bone. The arm is brought down to the side, properly placed upon the pad, and then bound down firmly by a roller passed around the arm and thorax: the fore-arm is placed in a sling.

FRACTURE OF THE LOWER EXTREMITY OF THE HUMERUS, when just above the condyles, so closely resembles dislocation of the radius and ulna backwards, that much care is necessary to distinguish the true nature of the injury.



Diagnosis.—In fracture, crepitus can be produced; the deformity can also be readily removed by moderate extension of the arm, but the deformity returns as soon as the extending force is withdrawn; the length of the arm of the injured side, when measured from the acromion process to the fore-arm at the bend of the elbow, is shorter than that on the sound side. None of these

conditions are found in dislocations at this joint ; they serve, therefore, to distinguish fractures.

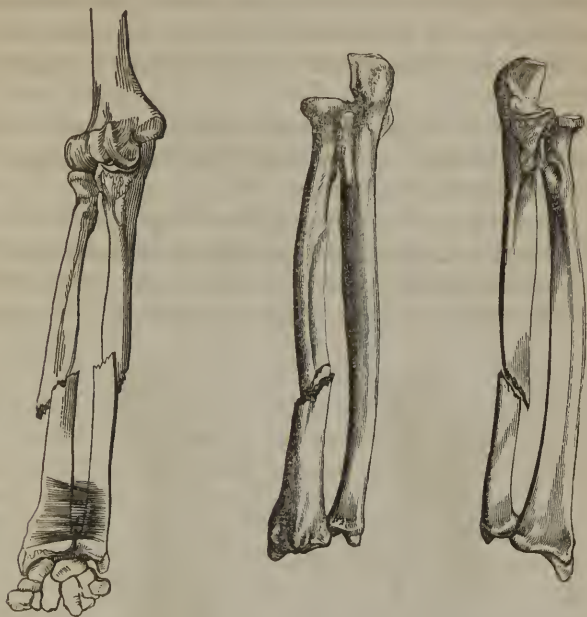
Treatment.—Remove the inflammation and tumefaction by rest, and the application of leeches and cold water ; then reduce and coaptate the fracture by extension, and apply two angular splints, narrower than the elbow, placing one in front and the other behind the arm, the two horizontal limbs of the splints resting upon the upper and lower surfaces of the fore-arm ; pass a roller around the fore-arm and arm, binding the splints firmly to the limb. Dr. Physick's angular splints for fractured condyles, answer very well also for this injury.

IN FRACTURE OF THE CONDYLES OF THE HUMERUS, it is necessary to reduce the fracture, and distortion of the joint, by extension, and manipulation about the point of injury, in order to adjust the broken portions of the humerus : retain them in this position by Dr. Physick's apparatus, which consists in four pairs of splints, or one pair with a movable joint, to vary the angle long enough to reach from the shoulder to the elbow, and thence three inches beyond the ends of the fingers, being about two inches broad. The first pair is to be made at a *right angle*, the second *more obtuse*, the third a *more obtuse angle still*, and the fourth *straight* : these, with a roller, complete the apparatus.

The fracture being reduced, and the elbow bent at a right angle, the roller commenced at the hand ascends the fore-arm and arm by circular and reversed turns to the shoulder ; the two right-angle splints are applied, one upon the outer and the other upon the inner side of the limb. The roller is then brought down by circular turns, binding the splints firmly to the extremity, and the fore-arm is placed in a sling : the ends of the splints must always be padded with cotton or lint, to prevent excoriation of the skin. After two or three weeks the rectangular splints can be taken off and obtuse splints substituted ; removing the dressings, after two or three weeks, every five or six days, passing alternately from a right angle to a straight line, making gentle flexion and extension of the joint to prevent ankylosis.

FRACTURE OF THE FORE-ARM.—In fracture of the fore-arm, both bones of the fore-arm may be fractured upon the same level,

or at different points. The fracture occurs, generally about the middle of the bones, with an angular derangement. The fracture may occur in one bone alone,—the radius being oftener broken



than the ulna, owing to its connexion with the carpus, and, when near the wrist, may be mistaken for dislocation, but can easily be recognised by crepitation, and the deformity returning after having been once reduced. The ulna may be broken whilst the radius is left entire.

The *olecranon* process of the ulna may be fractured, either by the action of the triceps muscle or direct violence.

The *coronoid* process is sometimes fractured, but this is of rare occurrence.

Diagnosis in fracture of both bones is evident from the angular deformity which exists: in fracture of one bone alone, crepitation can readily be felt, by taking hold of the hand and making the movements of pronation and supination; the other hand

placed upon the seat of injury, will feel the crepitation from the upper fragment of bone not rotating with the lower.

Fracture of the *olecranon process* is recognised by the space between the broken points; the upper portion of the olecranon is generally drawn up, by the action of the triceps, some distance above the joint. The joint can be readily bent, but is straightened with difficulty.

In fracture of the *coronoid process*, there is dislocation of the ulna backwards, with great projection of the olecranon process, and difficulty in bending the elbow.

TREATMENT OF FRACTURES OF THE FORE-ARM.—The treatment of fractures of the fore-arm, consists in making the soft parts in the interosseous space serve as a splint to force the fragments outwards, and to keep the bones in apposition. Two splints,



long enough to reach from the elbow beyond the finger ends, and wider than the fore-arm (this is an important point), so as to avoid lateral pressure upon the bones. These splints should be convexly padded with lint, tow, or cotton, along that part of their

length which corresponds to the interosseous space, and wrapped with bandage. The fracture should be coaptated by extension, and the fore-arm placed with the thumb uppermost, or intermediate between pronation and supination. The splints must now be applied upon each side of the fore-arm, to press firmly in the interosseous space, and should be applied with care, so as not to press upon the condyles of the humerus, else troublesome excoriation is sure to take place. The elbow should be well protected also, by placing cotton under the ends of the splints: the splints being firmly bound to the limb by circular turns of a roller, the fore-arm is then placed in a sling.

The deformity and consequent loss of pronation and supination of the fore-arm, and great impairment of its utility by neglect of the foregoing rules, is demonstrated in the preceding figure: an error that cannot be too anxiously avoided.

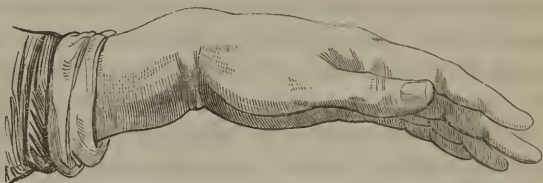
In the treatment of fractures of the fore-arm, it secures more perfect rest to the part, and answers remarkably well to have the internal splint made like the right-angle splint for fractured condyles of the humerus, binding its upper limb to the arm, thus preventing motion of the elbow-joint.

FRACTURE OF THE LOWER END OF THE RADIUS, may readily be mistaken for dislocation of the radius at the wrist joint. Great care should therefore be used in making a diagnosis in injuries about this joint. Fracture of the radius at this point may be distinguished from dislocation, by crepitus and the easy reduction of the deformity, also by the return of the distortion as soon as extension of the limb is relaxed.

The fracture should be reduced by extension and direct pressure upon the broken fragments, and the padded splints recommended in fractures of the fore-arm, or the apparatus of Dr. Rhea Barton, applied, to keep the bones in apposition. This last consists in two wedge-shaped pads, about three inches long, and as wide as the wrist; two splints, as directed for other fractures of the fore-arm, and a roller.

The fracture being reduced, the pads are placed one upon the front and the other upon the back of the wrist, pressing upon the broken ends of the bone in such a manner as to insure, and con-

tinue their coaptation. The splints are then applied as in the former cases, (without being padded,) and secured by circular turns of a roller; the fore-arm is then placed in a sling.



After the lapse of a couple of weeks, passive motion of the joint should be commenced with care, and continued to the end of the treatment, to prevent ankylosis.

In fracture of the *olecranon process*, the elbow joint is to be straightened, and bandaged by circular and reversed turns of



a roller, from the hand to the injured joint; the fragment should then be brought down and adjusted, the roller passed above it, and around the joint, in the form of a figure 8, until it is firmly fixed; the roller is continued up the arm to the shoulder, to annul the action of the triceps muscle. A splint is now placed in front of the joint, extending some distance along the arm and fore-arm, and the roller passed in circular turns, binding the splint firmly to

the limb. In three weeks' time passive motion should be communicated to the joint, and frequently repeated to prevent ankylosis. The union in this case will be ligamentous.

In fracture of the *coronoid process*, the joint must be restored by extension, the limb bent at right angles, bandaged to keep it in this position, and the fore-arm placed in a sling. Union will be ligamentous here also.

In this fracture the coronoid process is drawn upwards by the action of the brachialis anticus; probably, therefore, the best treatment is to flex the fore-arm upon the arm, binding them together by circular turns of a roller. If there should be a disposition to displacement backwards in the ulna, apply an angular splint in such manner as to rest upon the back of the arm and fore-arm, and embrace the elbow joint.

Fracture of the *carpus* is generally accompanied with so much injury, that amputation is necessary; where this is not the case, rest, close watching, and treatment upon general principles, according to the extent of the injury, must be pursued.

Fractures of the *metacarpal bones* are easily recognised; still, there are no fractures more difficult to repair without deformity.

The fracture should be reduced and kept as nearly as possible in a normal position, by means of compresses, splints, and bandages.

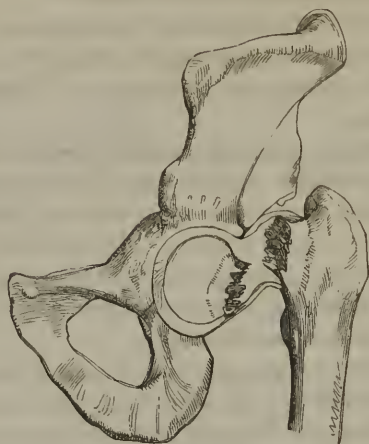
Fractures of the *fingers*, should be treated with four small splints and bandaged with tape, and the fore-arm placed in a sling, as in the former cases.

FRACTURES OF THE LOWER EXTREMITIES.

FRACTURE OF THE FEMUR.—Fracture of the femur should be made a subject of careful study, from the fact, as Mr. Pott remarks, “they so often lame the patient, and disgrace the surgeon.”

Fracture of the *neck of the femur*, occurs both within the capsular ligament and external to it. Fracture within the ligament is the more common, but is very rare in persons under fifty years of age, and is mostly met with in old women: in addition to the

changes which the bones undergo in advanced life, as deficiency of bone-earth, and sponginess of the cancelli,—the neck of the



femur is always peculiarly *atrophied*, *shortened*, and *sunk*, from the *oblique* to the *horizontal* position; changes which necessarily render it more liable to fracture.

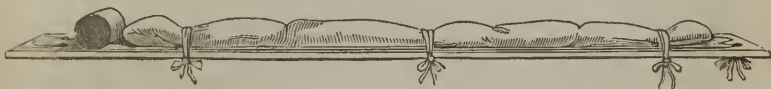
Diagnosis in fracture of the neck of the femur is sufficiently easy, with a little care, to avoid the error of confounding it with luxation. In fracture there is pain in the hip, the limb is shortened half an inch to two inches; the foot is turned outwards, *crepitus* may be felt by placing the hand on the trochanter, and extending the limb to its proper length, then rotating it. The trochanter is less prominent than on the sound side, and the limb may be freely moved, although with pain. In some cases the shortening of the limb does not occur until some days after the accident, and is in some cases inconsiderable. The limb is sometimes turned inwards. But fracture should be suspected, whenever an old person has received an injury about the hip, and complains of pain in it, whether there is shortening of the limb or not.

Prognosis is very unfavourable in these cases; they are always tedious, bony union rarely taking place in the old subject, and sometimes no union at all occurs.

Treatment in very old subjects consists merely in placing the patient in bed and keeping the limb quiet, or by a felt splint, or the curved splint of Dr. Physick for coxalgia, for a couple of weeks,



or until the shock and contusion occasioned by the accident have passed off, and then allowing the patient to get about as well as possible on crutches. After a time a false joint is formed, the stump of the cervix becomes rounded and covered with a smooth



porcellaneous deposit, and plays in a socket formed by the absorption and hollowing out of the head of the bone. But if the patient

be young, this fracture may unite by bone; he should, therefore, have the fractured extremities coaptated and kept in apposition by Physick's Desault's apparatus for fracture of the femur, or Liston's long single splint, which acts on the same principle, but is less complete in answering the indications.

Fractures immediately outside the joint, through the trochanter, unite readily enough even in very old persons. It may not always be possible, Mr. Liston observes, "to decide exactly whether the joint is involved or not; but the greater degree of shortening and mobility of the limb, with the more distinct feeling of crepitation, will often enable the surgeon to distinguish the nature of the case, and to decide upon the practice.

Mr. Druitt, remarks that "fractures of the femur *just below the trochanters* is liable to be followed by great deformity and non-union; because the upper fragment is tilted up forwards by the psoas and iliacus muscles. The best plan of treatment, is to place the patient on a fracture-bed, with the trunk and thighs bent at a very acute angle, so as to relax the offending muscles."

FRACTURE OF THE TROCHANTER MAJOR, is produced by great violence.

Diagnosis.—The trochanter is displaced upwards, by the lesser glutei muscles, and by placing the hand upon the seat of fracture and rotating the thigh, crepitus may be felt.

Treatment, in this accident, consists in recumbency and a position securing relaxation of the displacing muscles. Union in this case is generally ligamentous.

Diastisis, or separation of the *shaft* of the bone from its *epiphysis*, may occur in the young subject, by direct violence or twisting of the limb. Reduction in these cases is effected by extending the limb and fixing it by splints of wood or paste-board.

FRACTURE OF THE SHAFT OF THE FEMUR may be the result of force directly or indirectly applied.

Diagnosis is very plain in this case: there is deformity of the thigh, which may be angular in transverse fracture, and in oblique fracture considerable shortening; crepitus is perceptible and the lower fragment is generally drawn backwards, whilst the upper is tilted forwards.

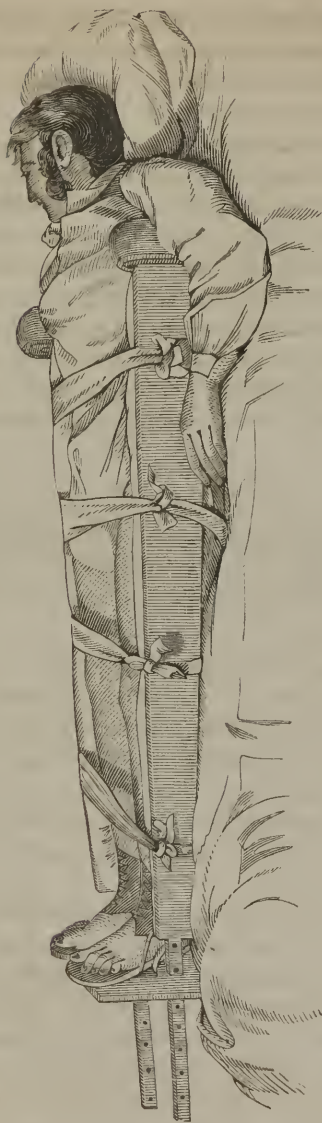
Treatment of this fracture is accomplished by extension, and coaptation of the broken extremities of the bone, and the application of Desault's apparatus, as improved by Dr. Physick, which answers the indications better than any fracture apparatus that has been employed in this injury. This improved apparatus consists of five or six pieces of *broad tape*, or pieces of roller; a *splint cloth* (which is a piece of muslin a yard wide and one and a half long); a *splint* of binder's board, two inches broad and nine long. *Scultetus' bandage*, which consists of pieces of roller, two or three inches wide, long enough to pass round the thigh, and laid down to overlap each other two-thirds of their width: *two bags* four inches wide, and long enough to extend from the hip to the foot; these are loosely filled with oat chaff; *two silk handkerchiefs* folded diagonally, or some other material, for *extending and counter-extending bands*; *three wooden splints*, one four inches wide and long enough to reach from near the axilla to some distance beyond the sole of the foot; at the upper and lower extremities of this splint, there are mortise-holes to pass the extending and counter-extending bands through; about four inches from the lower extremity, a cleft three inches long, with a notch in it, stands off at right angles to the splint: the second is nearly as wide as the former, and long enough to extend from the perineum to the foot: the third is as long as the thigh.

The application of this apparatus is as follows: a firm mattress with a hole in it for the evacuations, is covered by a sheet. Or what is far better and more convenient, is a frame the size of the mattress (which should always be hard); in this frame strong canvass is set, with a hole in the centre for the nates; it is to be covered by a sheet and laid upon the mattress. Under each corner of the frame is a leg six or eight inches long, fastened to it by a hinge; when the frame and patient are raised from the mattress, the legs fall and rest upon the bedstead, and thus sustain the patient whilst he has his passage, with ease and without disturbance of the fracture. The patient may be raised with greater facility by having an arm attached to each corner of the frame with a strong hinge; these allow the arms to hang by the side of the bed when not in use. This simple fracture-cot should be employed in all cases of

fractures, dislocations, or other injuries, wherein the patient cannot rise from his bed to evacuate the bowels.

Upon the sheet is laid the pieces of strong *tape* or *roller*; the *splint-cloth* is laid over them lengthwise across the mattress; near the upper edge of the splint-cloth, midway between its ends, is laid the *splint of binder's board*; over the splint is laid the bandage of Scultetus, beginning at the top and laying down sufficient to reach from the groin to the knee. The patient, divested of clothing, is now laid upon the dressings with the injured thigh over the strips of Scultetus, the extending band is passed round the foot in the form of a figure 8, and given to an assistant; the counter-extending band is placed in the perineum, between the genitals and the injured thigh, one end in front of the body, the other behind it, and given to an assistant: by these, extension and counter-extension are made, and the fractured bone coaptated by the surgeon; who then applies the bandage of Scultetus, by commencing with the strip nearest the knee: the two long splints are rolled up, one in each end of the splint-cloth, the stuffed bags are applied to fill the spaces between the splints and the limb: the extending and counter-extending bands are passed through the mortise-holes and fastened; the lower one passing over the cleft at the bottom, to make the extension in a line with the axis of the limb; the tapes are now tied to keep the splints applied.

An equally efficient and more easily managed application of this principle, is to make a fracture-box, by taking these two long splints of Desault, as the outer and inner sides, making the inside splints long enough to extend beyond the foot; and by applying a back splint of sufficient width, the same length as the inner one, fastening the three splints by hinges, and by attaching a foot-board worked by a screw, the fracture-box is complete. In this should be laid a cushion loosely stuffed with oat-chaff; which should extend from the hip to the heel, embracing the limb. The extending and counter-extending bands having been applied in the same way as before, or a laced gaiter may be applied to the foot instead of the handkerchief; the limb is placed upon the cushion, and extension and adjustment of the fracture having been made, the sides of the fracture-box are brought together and fastened by strips of bandage.

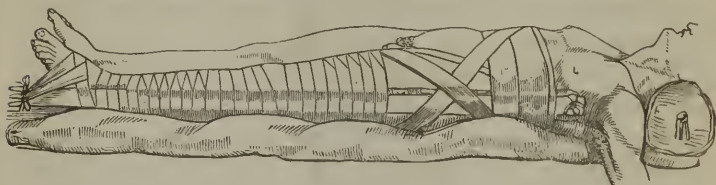


Dr. Gibson recommends very highly (in cases of fracture of the femur) the apparatus of Hagedorn, modified by himself and represented with sufficient distinctness in the annexed plate to preclude the necessity for explanation.

The counter-extension is made partially from the axillæ, but principally from the acetabulum of the sound side. It is evident that neither of these points affords effectual resistance.

The apparatus of Mr. Liston consists of a single splint, pad, roller, and extending band; the preparation of the splint is shown in the treatment of fracture of the neck of the femur.

The application of this apparatus consists in applying a narrow roller from the foot to near the site of fracture, to prevent infiltration; the perineal band and splint are now applied, and the roller, carried under the sole of the foot, turned round the ankle and heel,



being previously wadded; the roller is carried repeatedly through the notches in the end of the splint, as it crossed over the dorsum of the foot, and ultimately turned round the limb to near the groin. This is the only apparatus employed or recommended by Mr. Liston, in fractures of the femur.

Oat-chaff is probably softer than any material that can be employed for this purpose; it is the best variety of chaff that can be used.

Extending and counter-extending bands should consist in hose, or tubes made of cotton, linen, or buckskin, well stuffed with raw or carded cotton, which is the best material for protecting the skin from painful pressure, and excoriation. These bands should always be made as large as the part to which they are to be applied will admit. Shawls and handkerchiefs are objectionable as extending bands, from the hardness of their edges and plaits cutting into the skin.

A *Foot-board* fitted with a screw, to an apparatus from the treatment of oblique fracture of the thigh, is of great advantage, by enabling us to keep up constantly the same amount of extension, by turns of the screw counteracting the stretching of the bands: whereas, without such a foot-board, we are obliged to untie the extending band before we can tighten it.

FRACTURE OF THE FEMUR BELOW THE TROCHANTER is exceedingly troublesome to treat, and is liable to be followed by deformity and non-union. The upper fragment is tilted up by the action of the *psoas magnus* and *iliacus internus* muscles, whilst the abductor muscles of the thigh draw the lower fragment upwards and inwards.

Treatment.—Probably the best treatment that could be desired in this case, is the double inclined plane, placing the patient as nearly as possible in a sitting posture, to relax the *psoas* and *iliacus* muscles; placing the base of a wedge-shaped compress over the upper fragment, and applying over this a splint extending down the front of the thigh near to the knee, and binding them down firmly by a roller. The limb is then to be placed over the double inclined plane, the weight of the hips (for they should not press upon the bed) keeping up constant extension upon the limb.

It is rare to see an oblique fracture of the femur cured without more or less shortening.

FRACTURE OF THE CONDYLES OF THE FEMUR may extend into the knee-joint. Crepitus in this case is felt upon slight motion of the part; there is also much pain and swelling of the joint.

Treatment.—The knee should be placed in an extended position, and the fragments of bone retained in apposition by splints and bandages. After the first two weeks, if the part be not too painful, passive motion should be frequently communicated to the joint, to prevent ankylosis.

FRACTURE OF THE PATELLA, longitudinally, is the result of direct violence.

Treatment.—If motion of the joint be prevented by placing a straight splint behind the knee-joint, and retaining it there by bandage, bony union will readily take place.

Transverse fracture is more common, and is oftener the result of muscular action than direct injury.

Diagnosis is perfectly easy here; for whilst the lower fragment remains in situ, the superior portion is drawn up by the extensor



muscles of the leg, and a wide hiatus is perceptible. The patient can flex the leg with facility, but can scarce extend it.

Treatment in this case consists in passing a roller, by circular and reversed turns, from the foot to the lower fragment. The upper fragment is then brought down in contact with the other, and the roller is passed above the patella and around the knee in the form of a figure 8, and with circular turns, in such manner as to retain the fragments in contact. The roller, by circular turns, next confines the muscles of the thigh. A straight splint is now placed behind the joint, fastened by the roller, and the limb kept quiet.

Union is generally ligamentous, but may be bony, if the parts be kept in perfect contact. In six weeks' time, or sooner, passive motion should be communicated to the joint.

Desault's apparatus for fracture of the patella consists in one splint two inches wide, long enough to extend from the tuberosity of the ischium beyond the heel, two rollers, and a compress or strip of bandage the length of the limb. In its application, the compress is laid along the front of the leg and thigh; a roller is applied by circular and reversed turns from the foot to the knee; two longitudinal slits are now cut in the compress at the knee-joint, into which the fingers are passed, the upper fragment is drawn down and coaptated, the bandage passed like a figure 8 around the

joint, binding the fragments of the patella together, and carried up the thigh by circular and reversed turns. The splint is applied to the back part of the limb, and secured by circular turns of the second roller, and the thigh is flexed upon the body, to relax the rectus femoris muscle. Ligamentous union generally results, and the patient is enabled to walk with care in eight or nine weeks, by the aid of a cane.

FRACTURES OF THE LEG.

FRACTURE OF THE HEAD OF THE TIBIA is the result of direct violence, the fracture extending into the knee-joint.

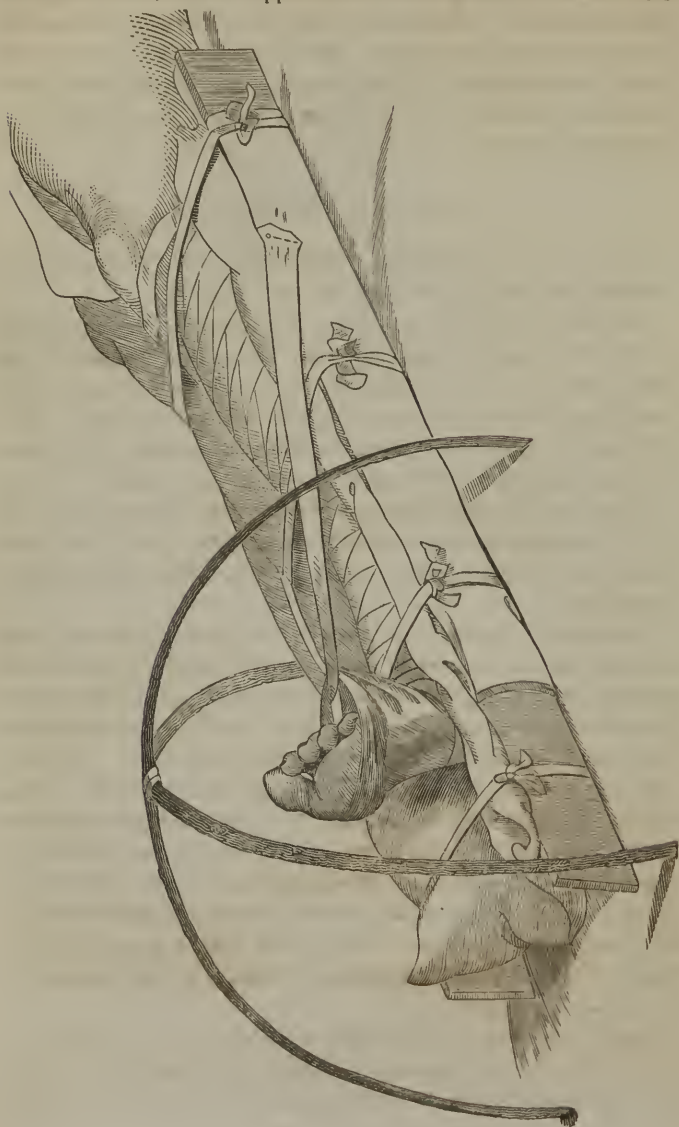
Treatment.—Inflammation must be reduced by the appropriate means, the fractured bone and joint being kept straight by the application of splints, behind the joint, so that the condyles of the femur may act as splints, and keep the fragments in place. Passive motion should be communicated after five weeks, or as soon as the consolidation has advanced so far as to admit of it.

FRACTURE OF THE TIBIA OR FIBULA, or of both bones, by careful examination, can be readily recognised. Both these fractures require the same treatment, except fracture of the fibula near the ankle.

Treatment of fractures of the *tibia* and *fibula* is effected by two different kinds of apparatus: one consists in laying upon a firm mattress four pieces of tape or roller; over these a splint-cloth; upon this a soft pillow; on this sufficient strips of the bandage of Scultetus to cover the leg from the ankle to the knee. The fractured leg is then laid upon this bandage and the centre of the pillow; the fragments are coaptated, and the bandage of Scultetus applied from the ankle up; two splints, three inches wide and a half inch thick, longer than the leg, are rolled, one in each end of the splint-cloth, and brought up so as to cause the pillow to fit the leg snugly; the tapes are tied, and the foot is supported by a sling. Pressure from bed-clothes is prevented by two halves of a hoop crossed at their centres.

The *fracture-box* is preferable; it consists of three splints, or light boards, fastened together by hinges, which may be of leather. The sides and bottom of the box should extend from the knee,

beyond the foot. Fastened to the lower end of the bottom should be a foot-board, and the upper end of the sides should have mortise-



holes in them, to fasten counter-extending bands, when this is necessary. In this simple box, a pillow, filled with oat-chaff,



or feathers, is placed, and the fractured leg put upon it. The fractured extremities are adjusted, and the sides of the box brought together and retained by strips of bandage. Where extension is necessary, a gaiter or bandage of a handkerchief in the form of a figure 8 is placed around the ankle, and fastened to the foot-board. Counter-extending bands, if needed, are made fast to the upper part of the leg by means of a roller, and tied in the mortise-holes of the side-pieces of the box.

Fracture of the Tibia, just below the insertion of the ligamentum patellæ, is exceedingly difficult to treat, from the tilting forward of the upper fragment by the action of the rectus femoris muscle. In this injury there is no difficulty in the diagnosis.

Treatment.—The best mode of treatment in this case is to reduce the fracture by extension of the leg and pressure upon the superior fragment. Counteract the action of the extensor muscles of the leg by passing a roller firmly around the thigh; place the

base of a wedge-shaped pad upon the upper fragment, over this a splint extending down the front of the leg, and bind them down firmly by a roller extending from the foot to the knee. If it be thought necessary, the limb may then be placed in a fracture-box.

FRACTURE OF THE FIBULA, about three inches above the ankle joint, is not uncommon, and is often accompanied by dislocation of the foot.

Diagnosis is very plain. The foot is turned outwards, and the natural line of direction of the fibula is lost. By turning the foot



inwards, and placing the thumb on the seat of fracture, crepitus can be felt.

Treatment in this injury is accomplished by the application of Dupuytren's apparatus, which consists in applying the base of a thick wedge-shaped pad just above the internal malleolus; a splint, three inches wide, extending from the knee three or four inches beyond the foot, is laid upon the compress, and fastened to the leg

by a few turns of a roller passed just below the knee. A roller is then passed in the form of a figure 8 around the heel, external malleolus, and end of the splint: the foot is in this way carried inwards and retained there, and the fractured extremities of bone are thus brought in contact by making a fulcrum of the pad, and converting the lower fragment of the fibula into a lever.

FRACTURE OF THE INTERNAL MALLEOLUS occurs by violently twisting the foot inwards. Sometimes the fracture includes the whole of the lower end of the tibia.



Diagnosis is not difficult. The foot is turned or dislocated inwards, and crepitus can be readily felt.

Treatment for this injury is the same as for fracture of the lower part of the fibula—merely applying the apparatus upon the opposite side.

In *fractures of the tarsal and metatarsal bones*, which are always the result of direct violence, if amputation be not necessary, nothing can be done but to combat inflammation and to insure rest.

TREATMENT OF COMPOUND FRACTURES.

The treatment in compound fracture differs from that of simple fracture in the following respects. If the end of a bone protrude, and cannot be returned, it must be sawn off. All detached fragments of bone must be removed at once, and if necessary the wound may be dilated for this purpose. After reduction, the great object is to procure adhesion of the external wound, so as to convert the compound fracture into simple fracture. In the application of splints and bandages, the wound of the soft parts should be so arranged, if possible, that it may be dressed without disturbing the whole limb.

For the accomplishment of this important point, Dr. A. Hays's splint is one of the best that can be employed in compound fracture of the femur, and the same principle may be applied to compound fractures of other bones.

This splint is made by taking Physick's Desault's splint, and cutting out a portion of the long splint opposite the wound, sufficiently large to allow free access to it, so as to dress it as often as necessary, without disturbing the extension and counter-extension. The two pieces of the splint are united by a strong strip of iron, secured by screws. The iron is made of such shape as to keep the covering of the bed off the wounded part. A thin piece of board should be placed between the portion of the limb dressed and the ends of the splint, so as to give support to the part whence the segment of the splint has been removed.



Dr. Hays remarks: "This plan I found to meet my wishes and expectations very fully. The extension and counter-extension

being continued, the dressing might be repeated as often as requisite, without in the least disturbing the position of the limb."

When inflammation and swelling come on, bandages must be loosened, and cold applied; or if this disagree with the part, or be not agreeable to the patient, apply warm poultice. When the symptoms of inflammation require it, active antiphlogistic remedies should be used, but bleeding is rarely called for. The catheter must be used if required. The great object in the subsequent treatment is to prevent the lodgment of matter, by sponging and pressing it out carefully at each dressing, and applying compresses to prevent its accumulation, and, if required, to make openings for its discharge. In this state of excessive discharge, dry bran, as an absorbent, is one of the best beds the limb can be laid upon. If the patient seem likely to sink under the discharge and irritation, notwithstanding the use of tonics, wine, and good diet, amputation is the last resource.

In all cases where the application of splints and bandages are made, great care should be taken to avoid inordinate pressure. The integuments should be well protected by lint or cotton from the excoriating pressure of splints and bandages. Splints should never be applied over prominent processes of bone, where it can be avoided, since troublesome ulceration is apt to follow.

In fractures of the lower extremities, the use of the limb should be resumed gradually, crutches being employed at first, lest consolidation be not complete, and shortening occur.

The employment of the *starch* or *dextrine* bandage (the immovable apparatus), is very useful in cases of simple fracture and dislocation, after all inflammation and swelling have subsided.

In the application of these bandages, a dry roller should first be applied next the skin, the cavities about joints being filled up with cotton or lint, to make the surface as even as possible for the starch or dextrine bandage. Where considerable strength is desirable, pasteboard, soaked in hot water, can be neatly fitted to the part, and the starch or dextrine bandage applied over it.

The *immovable apparatus* possesses the great advantage of never slipping or slackening up, and does not require reapplication. It is very useful, if applied in cases proper for its employment;

but much mischief has sometimes been done by putting this on limbs whilst they were inflamed and still swelling: in these cases gangrene has followed. But this is evidently the abuse of a useful apparatus.

PSEUDO-ARTHROSIS, OR FALSE JOINT.

False joint may follow a fracture of any bone, but is generally found in fractures of the *shaft of the humerus* and *neck of the femur*. It arises either from premature use of the limb, old age, peculiarities of constitution, disease of the osseous system, or non-contact of the fragments of bone. In false joint the ends of the bone become round, smooth, and generally covered with a cellular or ligamentous substance. In some instances a ball and socket are formed, the ends rolling upon each other.

Treatment, in these cases, is directed towards exciting sufficient action in the broken surfaces to produce the secretion and deposit of callus. This is effected in various ways. After the lapse of eight or ten weeks, friction of the broken surfaces against each other should be made—gentle or otherwise, as the case may call for; the fracture should then be kept perfectly still for about two weeks, to see the effect of the increased action excited. Should this fail, the patient should be directed to use the limb for a short time, and again place the parts at rest, to derive all the advantage possible from increased action. This failing, a blister should be tried.

Dr. Physick's mode of treatment has been successful in many instances: it consists in passing a seton between the fractured surfaces. A long, narrow seton-needle, either flat or round, is armed with a skein of silk or other material; the limb is extended, to separate the fragments, and the seton is passed between them, care being taken to avoid all large vessels and nerves; the wounds made by the needle are closed by lint, and the limb placed at rest in splints and bandages. The application of the immovable apparatus is particularly well adapted for these cases.

Resection should only be resorted to as a last resource; for it should be borne in mind that, by cutting down to the fractured

extremities of the bone, the fracture is converted at once from simple into compound, and the severity of the case greatly increased; particularly when it is situated in the thigh. In cases where resection is called for, circumstances must regulate the operation as regards *scraping* the separated surfaces, or removing portions of them by the saw. The latter operation should only be resorted to when the case imperiously demands it.

CRACKED BONES, OR INCOMPLETE FRACTURE.

It sometimes happens that a bone is cracked, when the force applied has not been sufficient to snap it off entirely, but just adequate to break the continuity of some of its fibres, whilst others remain entire. This injury is generally found where there are two bones, as in the leg or fore-arm, when the uninjured bone supports that which is partially broken. I have met with this accident in the fibula. It is probable that it occurs occasionally in most bones, although this injury is rare.

Diagnosis.—Diagnosis is more difficult when the bone is merely cracked, than when the solution of continuity is complete: still, with care, it may be recognised.

The patient is unable to use the limb without considerable pain; he has also a sense of pricking about the seat of injury, and when the bone is closely examined, there may be a slight deviation from the direct line of the bone, but there is no crepitus; yet, when the above signs follow a severe fall or blow upon the part, and the pain and inability to use the limb freely, exist after the effects of the contusion have subsided, it is probable there is a solution of continuity in some of the fibres of the bone, although not all; in other words, the bone is cracked, although not entirely broken.

Treatment.—The treatment for the repair of this injury is the same as if the bone were broken into two fragments. It is not necessary to keep the apparatus quite as long applied as in complete fracture.

DISLOCATIONS.

Dislocation or luxation, in surgery, signifies displacement of articulating surfaces.

There is no class of accidents of more frequent occurrence, and none which endangers the reputation of the young surgeon more than luxations; both from the difficulty of diagnosis, in some cases, and the great difficulty of reducing the dislocation in others.

To be skilful and successful in the management of luxations, a perfect knowledge of the anatomy of the joints and muscular system is indispensable. Dislocations always involve the rupture of ligaments, and frequently of muscles, situated about the luxated joint. In the treatment of dislocations, constitutional means have to be resorted to as well as local. The constitutional means are for the object of relaxing the muscular system, and are particularly useful in dislocations of the hip joint, where the muscles are large and strong.

These means are *general bleeding*, hot bath (100°), nauseating doses of antimony, tobacco, and all means calculated to relax the muscles.

DISLOCATION OF THE JAW.—Dislocation of the jaw is produced by direct violence upon the chin, or by muscular action in yawn-



ing, and can only take place forwards. It may be complete or partial, as one or both condyles are dislocated.

Diagnosis.—The condyles rest in front of the base of the zygomatic process: the mouth cannot be shut, the chin is depressed, the condyloid space is vacant, and a prominence may be felt beneath the zygomatic process, accompanied with pain and indistinct articulation.

Treatment consists in placing the thumbs on the molar teeth, and the fingers under the chin; firm pressure is made downwards by the thumbs, whilst the chin is elevated by the fingers: the moment the bone is slipping into place, the thumbs are slipped off the teeth upon the gums. If there be difficulty in reducing both at the same time, one should be reduced before the other is attempted.

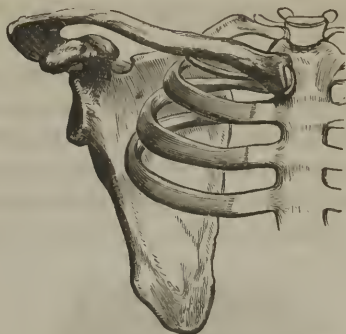


Sir Astley Cooper recommends, for *subluxation* of the inferior maxillary bone depending upon relaxation of the ligaments, blisters before the ear, the shower-bath, and the internal use of ammonia and steel.

DISLOCATION OF THE CLAVICLE.—Dislocation of the clavicle may occur at either extremity. The sternal end may be displaced *forwards* or *backwards*: the former is the more common.

The *scapular articulation* may be displaced *upwards*, gliding over the acromion process.

Diagnosis is easy in these cases. In luxation of the sternal



end *forwards*, the dislodged extremity is plainly seen and felt in front of the sternum, whilst the *backward* displacement leaves a hollow at the superior edge of the sternum; whilst a tumour, formed by the end of the bone, may be felt at the root of the neck.

In luxation of the *scapular extremity* the shoulder is depressed, and the end of the clavicle may be felt above the acromion process.



In all these varieties the deformity disappears upon elevating and carrying the shoulder outwards and backwards.

The *Treatment* of this injury is effected by carrying the shoulder upwards and outwards, pressing the clavicle, at the same time, into its articulation, and retaining it there by the application of the apparatus for fracture of the clavicle; keeping the limb in the dressings much longer, in dislocation of the acromion extremity, than would be done in fracture; for the ligaments unite slowly.

DISLOCATION OF THE STERNAL EXTREMITIES OF THE RIBS from their cartilages sometimes occurs, and may be recognised by an unnatural protuberance.

Treatment.—These cases are managed by placing a compress upon the extremity of the rib, and passing a roller round the chest, to secure the compress and keep the thorax at rest.

DISLOCATION OF THE VERTEBRÆ can hardly occur without fracture, and is the result of such violence that other symptoms demand our attention. To insure rest is the best that can be done.

DISLOCATIONS OF THE UPPER EXTREMITIES.

DISLOCATION OF THE HUMERUS.—Dislocation of the humerus from the glenoid cavity is usually the result of indirect force. The

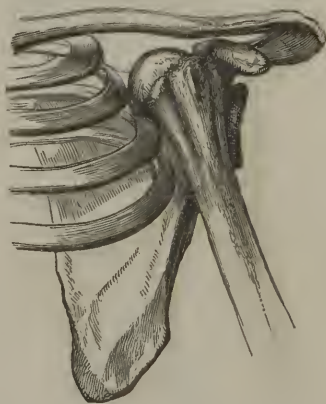


head of the humerus may be dislocated in three directions: *downwards*, into the axilla, which is the most frequent; *forwards*, be-

neath the pectoral muscle; *backwards*, on the dorsum of the scapula. *Subluxation* inwards on the coracoid process is sometimes met with.

Diagnosis.—In dislocation *downwards* there is a hollow beneath the acromion; the roundness of the shoulder is lost; the arm is somewhat lengthened; the elbow stands off from the side; the patient usually supports the fore-arm of the injured limb with the other hand, to prevent its head pressing painfully upon the axillary nerves. By carrying the elbow from the body the head of the humerus can be distinctly felt in the axilla; the patient cannot raise the arm to his head; the power of rotation is lost, but the motion of the limb backwards and forwards, as it hangs by the side, is still retained. On moving the limb, a slight crepitus will sometimes be felt. From the effusion of synovia and serum into the cellular tissues, this crepitation is not like the grating that fracture produces, and even disappears by continuance of the motion. Added to these signs is a change in the axis of the arm; a straight line, drawn from the elbow to the head of the bone, leads to the axilla, instead of the glenoid cavity of the scapula.

In dislocation *forwards* the nature of the accident is evi-



dent. There is depression beneath the acromion; the head of the humerus forms a tumour below the clavicle, which rolls beneath

the touch as the arm is rotated ; the limb is shortened, and carried backwards and outwards.

In dislocation *backwards* there is a protuberance on the dorsum of the scapula, below the spine, which rotates with the arm ; the



arm and fore-arm are approximated to, and carried across the chest. To these are added the other signs common to luxation of this joint.

Treatment of dislocations consists in restoring the articular sur-



faces to their natural positions, and retaining them there for a time. The means necessary to accomplish these objects are various.

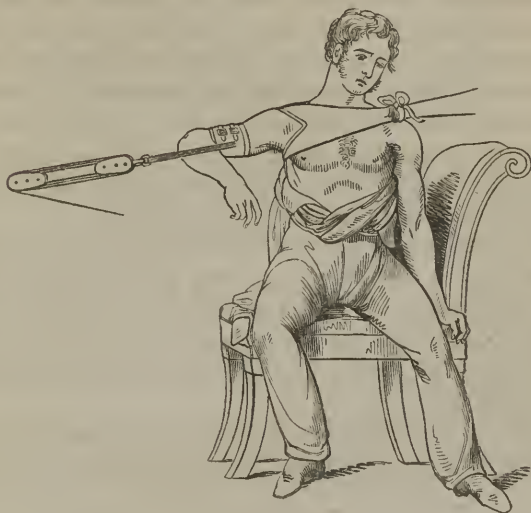
When the muscles are powerful, it may be necessary to relax them by constitutional means; as bleeding to syncope, the use of tartar emetic, tobacco, or any other proper means tending to relax the muscles.

The reduction of dislocation downwards is effected by putting the patient on his back. A ball is placed in the axilla, between the pectoralis major and latissimus dorsi muscles; the surgeon's heel is placed upon the ball, whilst he seizes hold of the wrist, and, by gradual and steady force, pushes the head of the bone into the glenoid cavity. If this power do not prove sufficient, a wet roller should be passed round the arm, above the elbow, and an extending band tied over it; this the surgeon either passes around his own shoulders, or allows several men to draw steadily upon it until the deformity is removed. If the foregoing means fail, the patient must be seated in a chair, and the scapula fixed by a bandage, which allows the arm to pass through it, setting firmly against the axilla and the acromion process: two men taking hold of this



band, and two hold of the one already applied to the elbow, a steady strain is brought upon the limb for some minutes; the sur-

geon places his foot upon the chair and his knee in the axilla of the patient; he should now raise the knee by extending the foot, at the same time he presses the acromion downwards and inwards with his hand. The head of the bone usually slips into the glenoid cavity with a snapping noise. Sometimes these means fail for want of power, and then pulleys must be applied to the bands,



instead of men. When the pulleys are employed, advantage may be derived from rotating the arm by using the fore-arm as a lever; the head of the bone usually slipping into the socket without noise.

An easy method of reducing luxations in old subjects, delicate females, and those of relaxed habits, is by seating the patient upon a chair, the surgeon placing his knee in the axilla and his foot upon the chair; taking hold of the elbow of the injured arm, he presses with his hand upon the acromion, and thus converts the arm into a lever and the knee into a fulcrum. By engaging the patient in conversation, to attract his mind from the injury, he bears down upon the elbow, fixing the scapula, and raising the knee at the same time; the head of the bone slips into the glenoid cavity, and the luxation is reduced. Sometimes, even in muscular sub-

jects, this plan succeeds. The fore-arm should then be placed in a sling, and the joint kept quiet.

Sir Astley Cooper advises, as a general rule, that the reduction of dislocations of this joint ought not to be attempted after they have existed twelve weeks.

Mr. White's mode of reducing this dislocation, and practised by M. Malgaigne, is as follows:—Lay the patient upon his back, and, raising the arm perpendicularly by the side of his head, so as to relax the supra-spinatus muscle, the surgeon seizes the elbow with one hand, whilst with the other he presses upon the acromion process, to fix the scapula; and the head of the humerus is drawn directly upwards into the glenoid cavity of the scapula.

Dislocations *forwards* and *backwards* are reduced by the same means and management as dislocation *downwards*.

DISLOCATION OF THE ELBOW JOINT.—Dislocation of the elbow joint may occur in five directions. Both bones dislocated backwards; both dislocated laterally; the ulna dislocated backwards; the radius dislocated forward; and, lastly, the *radius* may be dislocated *backwards*. Luxation of *both bones backwards*, however, is the most frequent.

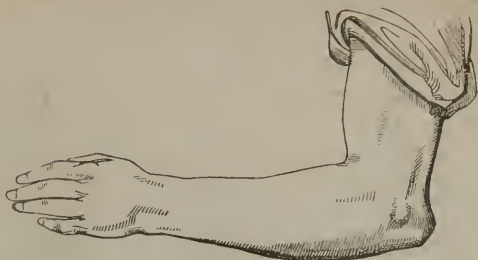
Diagnosis.—In displacement of both bones backwards, there is a projection at the posterior part of the joint; on each side of the



olecranon process there is a hollow; the lower extremity of the humerus is felt at the fore part of the elbow joint, as a hard tumour; the hand and fore-arm are fixed in supination, and cannot be entirely pronated, whilst the joint can hardly be flexed.

Treatment for this injury is as follows. Seating the patient in a chair, the surgeon places his knee in the bend of the arm, taking

hold of the wrist, bends the limb, at the same time pressing on the radius and ulna with his knee, so as to separate them from the



humerus, and throw the coronoid process from the posterior fossa of this bone. Whilst the pressure is kept up by the knee, the forearm is slowly and forcibly bent upon the arm, and the bones slip into their sockets.

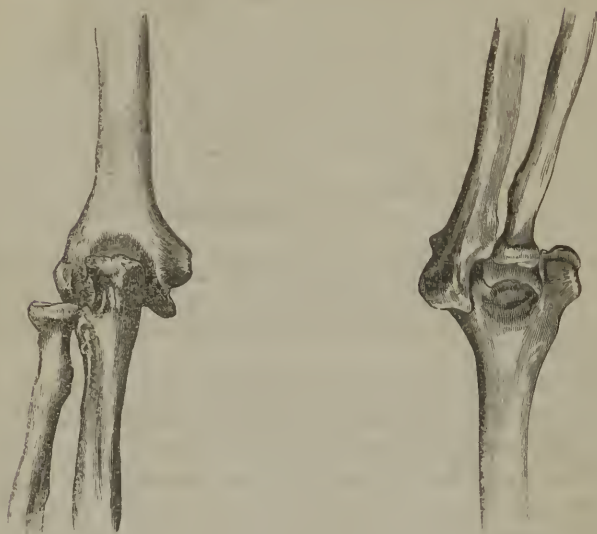
This reduction may be accomplished also by bending the arm forcibly around a bed-post; or whilst the patient is seated in an arm-chair, passing the arm through the opening in the back or side, thus fixing the body and limb, and reducing the luxation by forcibly bending the fore-arm, with one hand placed upon the olecranon process, to lift the bones into their places. The reduction having been accomplished, the fore-arm must be placed in a sling, the elbow bent at an obtuse angle, and supported with a splint. Cold lotions should always be applied to dislocated joints, to reduce tumefaction and inflammation.

Diagnosis in lateral dislocation of both bones backwards and outwards is arrived at by the greater projection of the ulna backwards than in the former case, and the coronoid process rests upon the back of the external condyle of the humerus. The radius forms a tumour on the outer side and behind the external condyle, and a hollow is seen above the head of the bone. If the hand be rotated, the head of the radius is distinctly felt to move.

In dislocation of both bones *backwards and inwards*, the same posterior projection of the elbow exists. The ulna rests behind the internal condyle, whilst the head of the radius occupies the

posterior fossa of the humerus, the external condyle of the humerus forming a large tumour on the outer side of the elbow.

Treatment is the same as in the former case.



DISLOCATION OF THE ULNA BACKWARDS is recognised by the contortion of the hand and fore-arm inwards. The olecranon process can be felt, as it projects behind the humerus. The fore-arm cannot be extended, nor even flexed to more than a right angle.

Diagnosis in this accident is sometimes difficult; but its distinguishing features are the contortion of the hand and fore-arm, and the projection of the olecranon process backwards.

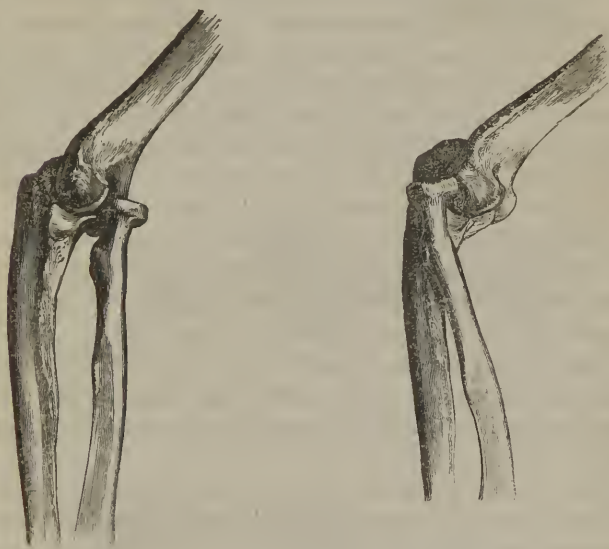
Treatment in this case is more easily effected than where both bones are dislocated. Bend the arm over the knee, seize the wrist, draw the fore-arm downwards, and the bone slips into its socket.

DISLOCATION OF THE RADIUS FORWARDS.—In this accident the head of the radius occupies the hollow above the external condyle of the humerus.

Diagnosis.—The fore-arm is slightly bent, but cannot be flexed

to a right angle, nor completely extended. When the fore-arm is quickly flexed, there is a sudden check, and one bone is distinctly felt to strike against the other. The hand is pronated. If the thumb of the surgeon be pressed in front of and just inside the external condyle of the os humerus, the head of the radius may be felt; and by rotating the hand, the head of the bone rolls also. This last sign, and the sudden check in bending the elbow, distinguish this accident from any other.

Treatment of this accident is effected by extension from the wrist, supinating the hand at the same time, and with the thumb pressing down the head of the radius, which slips into its place. The fore-arm is placed in a sling.



DISLOCATION OF THE RADIUS BACKWARDS may be recognised by feeling the head of the bone, (which makes a prominence on the back of the external condyle,) and the partial loss of the movements of the joint.

Its *reduction* and *treatment* are the same as in the former case.

DISLOCATION OF THE RADIUS AND ULNA at the wrist may take place *backwards* and *forwards*.

Diagnosis.—In luxation of both bones backwards, there is a tumour upon the fore and back part of the wrist: the hand is bent



back. The extremities of the radius and ulna can be felt on one side, and the carpus on the other, if the injured part be examined soon after the accident has occurred. In dislocation forwards, the relation of the bones to each other is altered. Sprains about the wrist, from severe falls, sometimes assume the appearance of dislocation of the bones, but may be distinguished from it by there being but one swelling in sprain, and that having come on gradually; also the relative position of the styloid processes of the radius and ulna with the carpus is unaltered in sprains.

Treatment.—Reduction is effected with facility in these cases, by making extension upon the injured hand whilst the fore-arm is fixed; the bones are then easily forced into place. The wrist and fore-arm are to be placed in splints and slung.

DISLOCATION OF THE RADIUS AT THE WRIST may take place *anteriorly*, *posteriorly*, and *laterally*. The signs and treatment of these are so like the former case, that the same rules are applicable.

DISLOCATION OF THE ULNA FROM THE RADIUS at the wrist occurs oftener than the last mentioned. It is easily recognised by the altered position of the styloid process, the projection of the ulna above the level of the os cuneiforme, and the twisting of the hand.

Treatment in this case consists in replacing the end of the ulna by extension and direct pressure on the end of the bone, confining it there by means of splints on the back and fore part of the wrist and fore-arm, and placing a compress upon the end of the bone, (which has a tendency to displacement, on account of the rupture

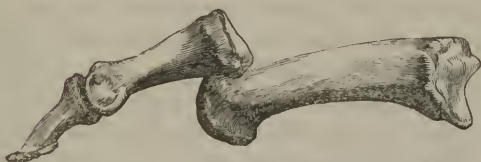
of the ligament.) A roller is then applied to retain the compress and splints.

DISLOCATION OF THE CARPAL AND METACARPAL BONES rarely occurs, and is always the result of gun-shot wounds or great violence, the effects of which are generally more serious than the dislocation.

DISLOCATION OF THE FINGERS takes place sometimes at the



metacarpal articulation, but generally between the first and second phalanges. The nature of the injury is evident, and may be reduced by extension, made by a bandage or tape applied by a clove-hitch.



DISLOCATION OF THE THUMB backwards on the dorsum of the metacarpal bone is of frequent occurrence. It sometimes takes



place in the opposite direction. The accident is easily recognised, but with more difficulty remedied.

Treatment.—A clove-hitch should be placed upon the first

phalanx, and extension employed for some time. Forcible and steady flexion is made towards the palm of the hand, and firm



pressure applied by the thumb of the surgeon at the same time upon the head of the bone. By these means the reduction is usually accomplished. This luxation is sometimes so unyielding as to call for the subcutaneous section of one or both lateral ligaments before the deformity can be removed.

Before division of the ligaments is made, the following mode of action should be resorted to in difficult cases, and it will generally succeed; for one of the greatest obstructions to the reduction is the overlapping of the ends of the bones, which from their form become completely locked. Soak the hand in warm water; apply a piece of wet leather around the thumb, and over this a clove-hitch of strong tape. In dislocation upwards, a loop of tape embraces the upper end of the phalanx, and is drawn with great force, by an assistant, perpendicularly upwards. Another loop of tape embraces the lower end of the metacarpal bone, and is drawn downwards by another assistant. Whilst the extremities of the bones are by these means unlocked, the surgeon draws the thumb, by the clove-hitch, towards the palm of the hand, and the bone usually slips into its normal position.

DISLOCATIONS OF THE LOWER EXTREMITIES.

DISLOCATION OF THE PELVIS is the result of great violence.

The *os innominatum* has been displaced upwards, separated from the sacrum at the sacro-iliac junction.

Diagnosis.—In this case the limb of the affected side is shortened and powerless, but the signs of dislocation and of fracture of the thigh-bone are absent, and the limbs, when measured from the anterior superior spinous processes of the ilia, are found to be of the same length. The anterior superior spinous process and the crest of the ilium of the injured side are on a higher level than those of the opposite side, and some difficulty may be experienced in evacuating the bladder.

Separation of the symphysis pubis occurs occasionally from a direct blow, or from difficult labour.

Treatment.—Efforts may be made, in both cases, to adjust the displaced bones, and the pelvis should be kept quiet by a broad bandage or belt. The bladder must be relieved by a catheter, and the effects of internal injury and inflammation combated.

DISLOCATION OF THE HIP JOINT takes place in four directions: *upwards*, upon the dorsum of the ilium; *downwards*, into the



foramen ovale; *backwards and upwards* into the ischiatic notch; and *forwards and upwards* upon the body of the pubes.



The first two varieties are of more frequent occurrence than the last two.



Diagnosis.—In dislocation of the head of the femur *upwards upon the dorsum of the ilium*, the limb of the injured side is from one to two inches and a half shorter than the opposite limb. The toe rests upon the top of the other foot, and the knee and foot are turned inwards; the knee a little advanced upon the other, and the thigh cannot be turned outwards, but may be carried slightly across the other. In the absence of swelling, the head of the femur may be felt to move upon the dorsum ilii, when the knee is rotated. The trochanter major is much nearer the anterior superior process of the ilium, than is natural; though less prominent than on the other side: the roundness of the hip on the injured side is lost.

This dislocation differs from fracture of the neck of the femur, (for which it has been mistaken,) in these points. In fracture, the knee and foot are generally turned outwards; the thigh can readily be bent towards the abdomen; and what makes the nature of the accident clear, is that the limb, by moderate extension, is made the length of the other, but returns again to its deformed position when this force is removed, and there is crepitation at the seat of injury.

Treatment.—In all dislocations of the hip joint, the constitutional means recommended are more or less called for. The muscles being relaxed, the patient is laid upon his back, a strong band is placed in the perineum, and made fast to a fixed point: above the knee is passed a wet roller, over this is fixed a band or towel, by



a clove-hitch, and hooked to a pulley made fast at a point in a direct line to the perineal band. The knee is bent at a right angle: a strain is brought upon the limb by the pulley, which must be steady, continuous, and without violence; stopping occa-

sionally when there is much pain created. As the head of the bone approaches the acetabulum, the surgeon rotates the limb inwards, and the bone slips quietly into its socket. As the head of the femur often catches against the edge of the acetabulum, it is good practice, when the bone is yielding to the traction of the pulley, to pass a towel or band under the thigh, near to the groin, and by this lift the head of the bone over the acetabulum.

The injured limb should then be kept parallel with the sound one by means of a bandage embracing both limbs, and the patient placed quietly in bed for two weeks or more. Subsequent inflammation must always be looked to in cases of dislocation.

DISLOCATION DOWNWARDS INTO THE FORAMEN OVALE.—

Diagnosis.—The injured limb is two inches longer than the other. In thin subjects, the head of the bone can be felt towards the perineum; the trochanter is less prominent; the body bent

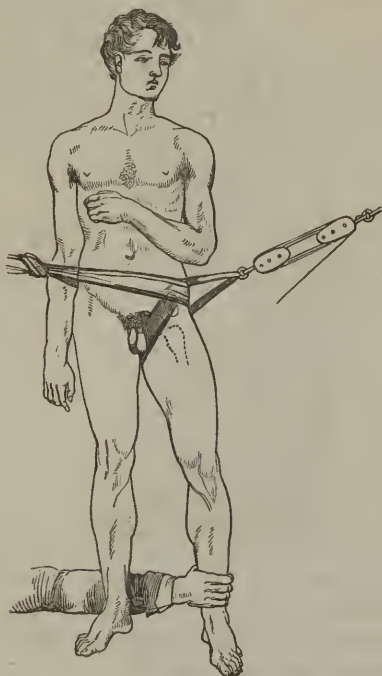


forward; the knee is advanced and separated from the other: the foot is generally straight.

The position of the head of the bone is below, and a little an-

terior to the axis of the acetabulum, and there is a hollow below Poupart's ligament.

Treatment.—The patient is placed upon his back; a band or girth is passed in the perineum, around the injured thigh, and hooked to a pulley, made fast to a point obliquely above the hip.



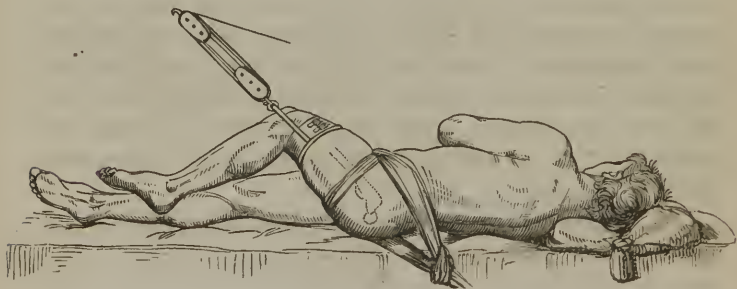
A counter-extending band or girth surrounds the ilia, one end passing through the loop formed by the first; this is made fast to a point opposite the injured hip. Traction is gradually made by the pulley, and when the head of the bone is moving from the foramen ovale, the surgeon grasps the ankle, draws it towards the middle line of the patient's body, and the head of the bone passes into the acetabulum.

DISLOCATION BACKWARDS INTO THE ISCHIATIC NOTCH is the most difficult to detect and to reduce.

Diagnosis.—The limb is half an inch, sometimes one inch shortened; the trochanter is behind its usual place; the knee and foot are turned inwards, but less than in dislocation upwards upon



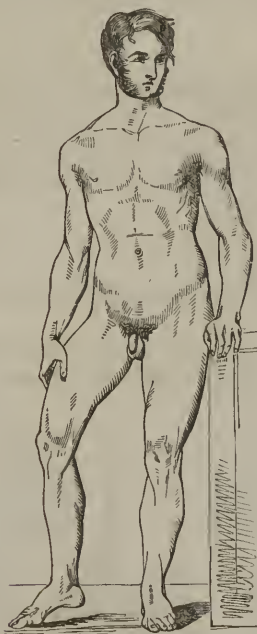
the dorsum of the ilium; the toe rests against the side of the other foot; the heel does not reach the ground; the knee is a little in advance of the other, and slightly bent; the limb is fixed, so that rotation and flexion is scarcely possible.



Treatment.—The reduction of this dislocation is extremely difficult. The patient is laid upon his side; the bands and mode of reduction are the same as in the former case; but in this injury the band, or towel, to lift the head of the femur, should always be used: the trochanter should also be thrust forward by the hand of the surgeon, at the same time.

DISLOCATION ON THE PUBES, is the most easy of detection of all the dislocations of the hip joint.

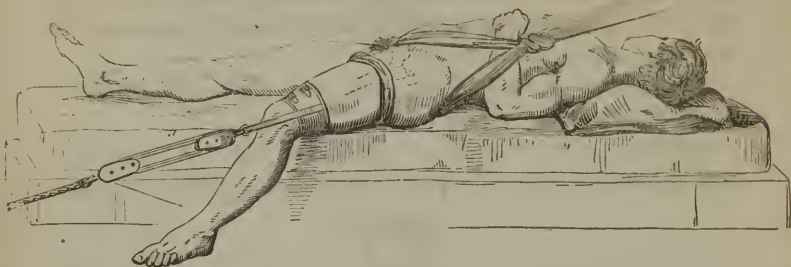
Diagnosis.—The limb is an inch shorter than the other; the knee and foot are turned outwards, and cannot be rotated inwards;



the head of the bone can be distinctly felt upon the pubes, at the outer side of the femoral artery and vein, and above the level of Poupart's ligament; upon moving or rotating the thigh, the head of the bone is felt to move with it.

This dislocation has been mistaken for fracture of the neck of the femur. It should be remembered that *shortening* and *eversion* are common to both; therefore, care is necessary in the diagnosis.

Treatment.—The patient is placed upon the sound side; a girth is passed in the perineum, and fixed to a point in front of the line of the body. The pulley is hooked to the band above the



knee, and made fast to a point behind the axis of the body, so as to draw the bone backwards. The head of the bone is lifted over the pubes and edge of the acetabulum by means of a band or towel, and drops into its place. The subsequent treatment is the same as in the other cases.

DISLOCATIONS OF THE KNEE JOINT.

DISLOCATION OF THE PATELLA.—Dislocation of the patella may occur in *three ways*: *outwards*, *inwards*, and *upwards*. A



partial dislocation of the patella outwards is not uncommon, and is attended with faintness and a sickening pain.

Luxation outwards is the most common.

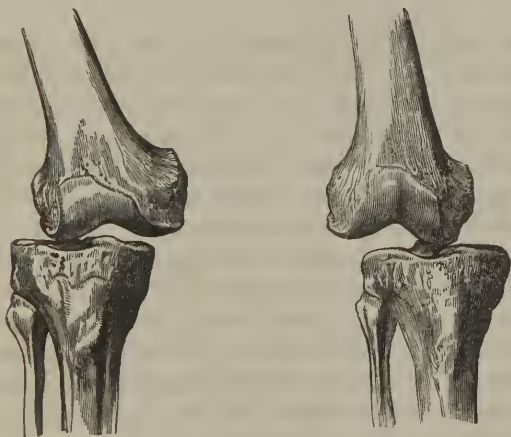
Diagnosis.—The nature of the accident is self-evident.

Treatment.—The patient is placed in the recumbent position, the leg is raised by the heel, which relaxes the muscles of the thigh, the surgeon now presses down the edge of the patella farthest from the joint, and the bone glides over the condyle of the femur into its normal position.

Dislocation of the patella *upwards* is caused by the rupture of the ligamentum patellæ, whilst the bone is drawn upwards by the action of the rectus femoris muscle.

Treatment.—Local depletion and evaporating or cold applications are to be used for the first six or seven days; then the same apparatus should be applied as recommended in fracture of the patella, and continued one month, before passive motion is communicated to the joint.

DISLOCATION OF THE TIBIA.—Dislocation of the tibia at the knee joint occurs in *four directions*: *backwards*, *forwards*, *inwards*, and *outwards*; the two latter dislocations are both rare and incomplete.



Diagnosis is very plain in these dislocations. In luxation *inwards*, the tibia projects on the inner side of the joint. Dis-

placement *outwards* is recognised by the tumour being on the outer side of the knee joint.

Dislocation *forwards*, the tibia is felt above and in front of the thigh bone, whilst the latter may be felt in the popliteal space. Dislocation *backwards* may be readily known by shortening of



the limb, projection of the condyles of the femur, depression of the ligament of the patella, and by the leg being bent forwards.

Treatment.—In these four varieties of luxations, reduction is accomplished by extension of the leg, and direct pressure to the ends of the dislocated bones. Inflammation is combated, and the joint confined for two or four weeks, (or longer, according to the nature of the case,) by splints and bandages.

COMPOUND DISLOCATION OF THE KNEE JOINT is a very rare accident, and generally requires immediate amputation.

DISLOCATION OF THE HEAD OF THE FIBULA from the tibia may occur. The head of the bone is thrown *backwards*; it can be readily felt and reduced, but slips from its position directly.

The patient suffers fatigue in walking and taking exercise; much weakness is also experienced.

Treatment.—Blisters should be applied to promote absorption of the superabundant secretion of synovia, and a compress placed

behind the head of the bone, which should be bound tightly to the tibia by a bandage or a strap buckled round the upper part of the leg.

DISLOCATION OF THE TIBIA AT THE ANKLE JOINT may occur in *four ways: inwards, forwards, outwards, and backwards*. This last variety is rarely met with: dislocation inwards is of most frequent occurrence.

Diagnosis.—In luxation of the tibia inwards, the internal



malleolus forms a tumour which threatens to burst the skin. The foot is thrown outwards; it rotates easily on its axis; there is a depression above the outer ankle; the foot can be moved laterally, and crepitus is felt about three inches above the end of the fibula, at which point that bone is almost universally fractured in this dislocation.

Treatment.—The patient is placed upon his back; the leg should be bent at a right angle to the thigh, and extension made upon the foot, whilst the thigh is fixed by an assistant, and direct pressure applied to the end of the tibia, and the deformity is removed. Dupuytren's apparatus for fracture of the lower part of the fibula is now applied, or splints and bandages, to keep the foot at rest

and at a right angle to the leg, and the patient kept in bed five or six weeks. Ten or twelve weeks will have elapsed before the use of the foot is restored. After the eighth week, frictions and passive motion will be required to restore the motions of the joint. At first the inflammation of the joint must be attended to, as in all other dislocated joints.

Diagnosis in dislocation of the tibia forwards.—The foot is fixed, and appears much shortened; the heel projects backwards,



and is firmly fixed; the toes are pointed downwards. The end of the tibia is felt as a hard tumour upon the tarsus.

Treatment.—The reduction and management of the case is the same as for dislocation inwards, excepting the use of Dupuytren's apparatus, which is not applicable to this case. Side splints and bandages, to keep the foot at right angles to the leg, with the heel on a pillow, are better.

Partial dislocation of the tibia forwards sometimes occurs. In this case the tibia rests half on the naviculare and half on the astragalus. The fibula is broken at the same time.

Diagnosis.—The foot appears shorter, is pointed downwards, and cannot be placed flat upon the ground without difficulty. The heel is drawn up and slightly projects; the foot is almost immovable.

Treatment.—This luxation is reduced by extension and direct pressure upon the tibia and heel, and retained by means of Dupuytren's apparatus for fractured tibia. Cold lotions should be applied to the joint.

Dislocation of the tibia outwards is attended with more injury to the joint, and is more dangerous than either of the other varieties. The malleolus internus is separated from the shaft of the bone, and sometimes the fracture passes obliquely through the articular surface of the tibia. The astragalus is sometimes fractured, and the lower extremity of the fibula is broken into several pieces.

Diagnosis.—The foot is turned inwards, the tibia thrown forwards and outwards upon the astragalus, and can be readily felt. There is great deformity of the joint, and the nature of the accident is evident.

Treatment.—The reduction of the dislocation is effected by the same means as in the other cases. A pad is placed upon the fibula above the ankle, extending a few inches up; two splints, with a foot-board, are applied to the sides of the leg and ankle; the foot is bandaged and fixed in the splints, so as to prevent the slipping of the tibia and fibula from the astragalus, and the limb laid upon its outer side. The local and general treatment is the same as in other cases, only more active. Six weeks will generally elapse before the patient can leave his bed, and even then be obliged to use crutches. Passive motion and friction are now to be employed, and in ten or twelve weeks the cure is complete.

COMPOUND DISLOCATION OF THE ANKLE JOINT is always a serious injury, of which Sir Astley Cooper says, "The first question which arises upon this subject is the following—*Is amputation generally necessary in compound dislocation of the ankle?* My answer is, certainly not."

The nature of this accident is evident at the first glance.

Treatment.—The treatment of compound dislocation of the ankle must depend in a great measure upon the extent of the

injury and the constitution of the patient. The displacement is reduced as in simple dislocation, and the principles before given for the management of compound fractures and simple luxations must be combined in these cases. There are many cases that require immediate amputation; but if this be not imperative, an attempt to save the limb should always be made where there is the least ray of hope. A proper rule of action in such accidents is to *keep the part quiet, and to meet symptoms as they arise.*

Partial or complete ankylosis is an unavoidable result from these injuries. Under the most favourable circumstances, three months generally elapse before the patient can even walk with crutches: many cases far exceed this time.

DISLOCATION OF THE ASTRAGALUS, though rare, sometimes occurs, and is always a serious accident. The nature of the injury is evident; the bone is generally dislocated forwards, and can readily be felt.

Treatment for the correction of this accident consists in extension of the foot, with the leg flexed, and direct pressure applied to the astragalus, and the bone usually slips into its natural position. The tension of the integument may be so great that sloughing is inevitable, unless the displaced bone be restored, which is not always possible; therefore the dislocation may become compound secondarily, and calls for the same treatment as if it were originally compound.

When the displaced bone cannot be replaced, three modes of treatment present themselves, viz., to retain the parts as they are, and risk suppuration; to amputate at the ankle joint, or to excise the displaced bone in the attempt to save the limb and joint. This last method is preferable.

DISLOCATION OF THE OS CALCIS AND ASTRAGALUS from the other bones of the tarsus may take place. The foot will then be turned inwards, as in talipes varus.

Reduction is easily effected by extension and direct pressure. The limb should then be supported by splints and bandages.

DISLOCATION OF THE TOES, from the metatarsal bones, as well as their phalanges, one from another, occur occasionally, and

are with facility recognised, and easily reduced by extension and counter-extension.

SUBLUXATIONS AND SPRAINS OF JOINTS.

These are troublesome varieties of injuries, arising often from momentary displacement of the bones, which strain or partially tear the ligamentous apparatus of the joints, and are accompanied with sickening pain and swelling of the joint, which may involve the synovial membrane.

The *treatment* of these injuries consists in restoring the bones to their normal positions by extension and direct pressure, if they do not return spontaneously; the application of leeches, fomentations, cold or counter-irritants, rest, and bandaging for a long time after the occurrence of the accident; for the joint remains weak and prone to recurrence of the injury.

RUPTURE OF MUSCLES AND TENDONS.

Laceration of muscular fibres often occurs from violent action. It is characterized by immediate lameness. The patient falls, and is unable to resume the erect position; much pain is felt at the seat of injury. There is generally consciousness of something having given way, accompanied with a sensation of a blow upon the part. There is seldom more than a few fibres of the muscle separated. The accident usually occurs in the gastrocnemius, and is generally situated just at the beginning of the tendon.

In *rupture of tendons* the same symptoms are observed as in the former case, accompanied often with an audible snapping noise, and the gap between the ends can be felt. The tendo achillis is more frequently ruptured than any other.

Treatment.—The management of these cases consists merely in position and rest. If the seat of the injury be in the gastrocnemius muscle, or tendo achillis, a slipper is placed upon the foot; a belt or band is placed round the waist or loins; to the heel or toe of

the slipper a stout cord or tape is attached; the leg is bent on the thigh, the foot is extended, and the tape made fast to the belt around the body. This position is maintained until the divided part unites. Reparation is slow, especially in rupture of tendons. The apparatus and position in which the limb is placed have to be continued one or two weeks longer than in fracture of a bone. When the patient first begins to walk, he should use a stick or crutch, and wear a high-heeled shoe.

FOURTH DIVISION.

Injuries of the Head—Concussion and Compression of the Brain—Concussion and Compression of the Spinal Cord—Softening of the Spinal Cord—Injuries and Diseases of the Chest—Surgical Diseases of the Mamma—Fissures and Excoriation of the Nipple—Surgical Diseases and Injuries of the Abdomen—Artificial Anus—Hernia—Diseases and Injuries of the Rectum and Anus—Diseases and Injuries of the Bladder and Urethra—Diseases of the Kidney—Diseases of the Prostate Gland and Urethra—Urinary Deposits, Gravel, and Diatheses which give rise to them—Urinary Calculi—Diseases of the Male Genital Organs—Diseases of the Female Genital Organs—Diseases of the Breast—Diseases of the Uvula, Tonsils, and Esophagus—Foreign Bodies in the Pharynx—Foreign Bodies in the Larynx and Trachea—Hanging—Drowning—Bronchocele or Goître—Ganglion or Tumours of Bursæ—House-maid's Knee—Bunion.

INJURIES OF THE HEAD.

HOWEVER slight wounds of the scalp may be, they should not be neglected, since they may be followed by erysipelas, or by inflammation and suppuration under the muscles and integument, or within the cranium, which might prove fatal. In these cases sutures should be avoided, unless it be impossible to keep the torn scalp in position without them. Ligatures should not be applied to bleeding arteries of the scalp, when pressure will command the hemorrhage, which is almost always the case. If the scalp be nearly or quite detached, it should be carefully washed and replaced. Should a blow on the head cause an extravasation of blood under the scalp which is constantly increasing, it is evident that an artery has been divided: in this case the position of the vessel must be ascertained if possible, and pressure applied over it to arrest the hemorrhage. In cases of suppuration under the scalp or occipito-frontalis muscle, incisions should be made early, to evacuate the matter: if

blood be extravasated, incision is not to be made into the integuments, unless it be positively necessary; but, on the contrary, absorption is to be promoted by bleeding from the arm, the application of cold to the scalp, and low diet.

CONCUSSION OF THE BRAIN.

Concussion, from *concutio*, to shake together. Injuries sustained by the brain, and other viscera, from falls, blows, &c.

Diagnosis.—This injury or interruption of the functions of the brain, the result of blows and injuries of the head, is not necessarily accompanied with organic lesion. Death is sometimes instantaneous, from cessation of the heart's action.

There are two degrees of concussion: in the slightest, the patient lies for a time motionless, unconscious, insensible, if roused he answers hastily and relapses into insensibility; after a time, however, he moves his limbs, vomits, and frequently recovers consciousness, remaining for some hours giddy, confused and drowsy.

In the more severe degree, there is profound insensibility, skin pale and cold, expression of countenance ghastly, pulse feeble and intermittent, sometimes not even perceptible at the wrist, breathing slow, or perceived only by an occasional sigh.

Prognosis.—Concussion does not often prove fatal, unless there be fracture of the cranium, or extensive extravasation of blood within: but when the pulse and respiration continue feeble for some hours, the danger is great.

Treatment.—The remedies employed, must depend upon the stage of the injury and condition of the patient. Concussion is occasionally succeeded by insensibility, which may last for several days. The patient lies as if in a tranquil sleep: when quiet, his pulse is regular, but on the slightest exertion it rises to 130 or 140 pulsations in the minute, and the carotids beat violently. When roused he can answer questions, but soon relapses into unconsciousness: sometimes a state of somnambulism comes on, the patient will get out of bed and move about the room, dress, or shave, and do a variety of things; notwithstanding which, he is insensible to what is passing around him.

There are three indications to be looked to in the management of this injury : first, to recover the patient from insensibility and collapse : secondly, to prevent inflammation : thirdly, to restore the faculties that may be impaired.

If the depression be extreme, and the pulse low ; warmth may be applied to the surface, and ammonia administered internally and held to the nostrils. When this interference is not necessary for the continuance of vitality ; the patient should be left to the recuperative powers of nature.

After reaction has taken place, the patient should be bled (unless too old or feeble) ; but if bleeding be resorted to before reaction has taken place, it may turn the scale of depression, which is already weighing the patient down, and thus produce death. Bleeding being a remedy for the consequences of concussion, it is not applicable, therefore, to the immediate injury. Purgatives, antimonials, rest, low diet, and an antiphlogistic regimen for a month, or longer, should be insisted upon after severe concussion of the brain.

In order to remove the remote consequences of concussion, (which consist in an infirm state of health and intellect, impairment of memory, or of the senses ; a tendency to inflammation, extravagant actions after drink or any excitement, headache, deafness, squinting, loss of memory, and tinnitus aurium,) a course of alterative mercurial treatment should be resorted to, with repeated blisters, or an issue, or seton, to the nape of the neck ; the shower-bath, frictions of the surface with a flesh brush, change of air, and a regular diet.

Pathology.—The brain is often found bruised or ecchymosed, or even lacerated : yet concussion has been fatal in cases where no injury to the brain could be detected.

COMPRESSION OF THE BRAIN.

Compression, from *comprimo*, to press. A diseased state (usually of the brain) occasioned by pressure.

This accident may arise in three ways : by extravasation of blood ; by fracture of the skull ; by suppuration within the cavity of the cranium.

Diagnosis.—The symptoms of compression are those of apoplexy: insensibility, general palsy, or it may be confined to one side; dilated, insensible pupils, yet sometimes one or both pupils are contracted; slow labouring pulse, skin often hot and perspiring; retention of urine, involuntary discharge of fæces, and stertorous breathing.

When compression is induced from extravasated blood, the patient, upon receiving the blow, is stunned, having cold skin, feeble pulse, and is insensible from the concussion: after a while he recovers his senses, but again in an hour or two becomes sleepy, confused and insensible, with stertorous breathing, slow pulse, and dilated pupils.

These symptoms correspond with those of *agavescent* apoplexy, in which the patient feels an acute pain in the head, caused by the bursting of a blood-vessel, and becomes sick and faint; he then recovers his senses, but soon after becomes quite comatose.

But if a large quantity of blood be extravasated rapidly, then the symptoms of compression follow those of concussion almost immediately. The same may be said of compression from fracture of the cranium with depression.

In compression from suppuration, the approach of the symptoms is more remote; for suppuration being the result of inflammation, therefore, time is necessary for its development.

The distinguishing diagnostic signs between concussion and compression are as follows.—In *concussion*, insensibility is immediate: in *compression*, it may come on after an interval: in concussion the pulse is weak, and the greater the insensibility the weaker it will be; the skin is usually cool and may be wet with perspiration: in compression the pulse is full and hard, and the skin hot. In concussion stertorous breathing is rare; in compression it is common: the pupil in concussion is variable, sometimes dilated and sometimes contracted, and generally sensible to light: in compression it is almost always dilated and insensible. In concussion the pulse becomes more frequent upon exertion: in compression it is unaltered. In concussion, the patient can be roused to answer questions: in compression, he remains insensible to all outward impressions.

Treatment in Compression of the Brain.—The head should be

shaved, and if there be no sign of fracture, the case must be treated as one of apoplexy; the indications being to avert inflammation and procure absorption of the extravasated blood: for these purposes, bleeding, cold applications to the head, purgatives and calomel in repeated doses are to be administered.

If the system be not relieved by these means, our last resource is trephining: when this becomes necessary it should be performed at the seat of injury, where a puffy tumefaction occurs generally, in a day or two after the receipt of the injury. If the seat of the injury be not known, it should be applied over the middle meningeal artery: one side of the body being more palsied than the other, it should be done on the opposite side of the head, for the reason that injury of one side of the brain, produces paralysis of the opposite side of the body. The section of bone having been taken away by the trephine, the extravasated blood should be removed by a sponge. The skull is said to be bloodless and white at the seat of the effusion, being deprived of its usual supply of blood by the detachment of the dura mater.

The treatment in a case of compression with depressed fracture of the cranium, only differs from the preceding in the necessity of immediate elevation of the bone, by the use of the trephine and elevator: but this operation is not called for in every fracture with depression.

In compression from suppuration the trephine has also been recommended and successfully employed: but in this case the diagnosis is exceedingly difficult, and, unless the trephine be applied over the abscess, no relief can be obtained: still, in desperate cases, where all hope of absorption is gone, it should be tried, since the cranium has been successfully trephined in many places at the same time.

CONCUSSION OF THE SPINAL CORD.

The spinal cord, like the brain, is susceptible of concussion by blows and falls; having its functions arrested or disordered, with actual lesion of its structure. The concussion may be either general or partial.

Diagnosis.—There is paralysis of the parts supplied by nerves arising from the injured part: this paralysis is of short duration, passing off in a few hours, or days: but reaction may prove excessive, and inflammation speedily supervene, attacking the cord, or its membranes, or both; ushering in a new train of symptoms. The immediate results of the injury may all seem to pass away; yet at a more remote period, (as observed in concussion of the brain,) an insidious chronic inflammatory process may occur in the cord or its membranes; causing in the one case thickening with effusion, and in the other purulent softening of slow progress.

Treatment.—The same principles must govern in the management of these cases as in concussion of the brain.

Absolute quiet must be insisted upon and the period of reaction carefully watched: antiphlogistic measures should be employed as circumstances may demand.

For a long time after the receipt of the injury, the patient should use all the precautions of a prudent invalid, to avert if possible, the insidious and formidable remote results which may possibly follow. If these be threatened, rest, with patient counter-irritation, and the careful use of mercury internally, must be resorted to.

Softening of the Spinal Cord.—Chronic, insidious, and intractable *softening* of the spinal cord is not an unfrequent consequence of severe falls, or blows upon the spine.

Diagnosis.—The lower limbs first begin to fail, the knees threatening to give way: the feet are moved oddly, and not planted with certainty upon the spot intended: the body is stooped, and the patient rarely walks in a straight line: the bowels become sluggish, and the abdomen enlarges: the urine is voided with difficulty: the arms are weak, and there is the same uncertainty and inefficiency with the hands, as observed in the lower extremities: sometimes there are neuralgic pains shooting down the back and limbs, occasionally affecting the head also. These symptoms gradually increase; the urine and fæces are passed involuntarily: the use of the limbs becomes more feeble, until they are nearly or quite powerless: the brain is involved; the mind grows imbecile, and the patient dies, often with symptoms of slow compression;

having suffered frequently, during the progress of the disease, with attacks of congestion of the brain.

Prognosis.—In this affection, is exceedingly unfavourable.

Treatment.—Little benefit should be looked for from treatment in this disease; indeed, the intelligent and prudent practitioner looks upon the case as incurable, and does not annoy the patient by the employment of painful and intolerable remedies, but contents himself with the use of simple means; palliating symptoms, and delaying the fatal issue, with as much comfort as possible to the sufferer.

Pathology.—The spinal cord is found more or less affected with ramollissement; it is sometimes liquid, or of the consistence of custard, and enclosed in the thickened membranes of the cord, from which it runs in a stream, when an opening is made through them. The membranes of the brain are generally much congested, with more or less exudation beneath them.

COMPRESSION OF THE SPINE.

This may be caused, as in the brain, by extravasation of blood, either on the surface or in the substance of the cord; by fracture and displacement of the vertebræ, pressing upon the cord; by inflammatory products exterior to the cord, or by purulent disorganization of the cord itself; the result of inflammatory action.

Diagnosis.—The symptoms are similar to those of compression of the brain; paralysis being the most prominent. If dislocation and fracture of the vertebræ be the cause of compression, this can readily be discovered by passing the fingers down the spine. If it result from inflammation, it is less sudden in its invasion, and signs of inflammatory action are observable about the spine, before those of compression appear.

Prognosis is at best unfavourable; but if, in the case of extravasated blood, the immediate risk be passed, hopes of a favourable result may be reasonably entertained; but unfortunately, where it arises from displaced fracture, or inflammatory disorganization, it is almost always fatal.

Treatment.—Little can be done in these cases by active means; rest and the expectant practice are more advisable; mitigating, as far as possible, the symptoms connected with paralysis. Upon the appearance of vascular and inflammatory action, mild antiphlogistic measures should be adopted; for in these cases extreme depletion is illy borne.

INJURIES AND DISEASES OF THE CHEST.

EMPHYSEMA OR PNEUMOTHORAX is a distension of the cavity of the pleura with air, and consequent collapse of the lung. It may be caused by a penetrating wound of the chest; the fracture of a rib, with wound of the lung, or the bursting of an abscess of the lung into the cavity of the pleura.

Diagnosis.—There is absence of respiratory murmur upon the affected side, where it is caused by wound of the lungs, with an exceedingly clear sound on percussion, with immobility of the ribs; in the sound side there is *puerile respiration*. Where the injury is dependent upon the bursting of an abscess, a *metallic tinkling* is audible, and upon directing the patient to cough, a drop of fluid falls from the orifice in the lung and drops to the bottom of the chest with this peculiar sound; or if the chest be shaken, the fluid can be heard to splash.

Treatment.—In pneumothorax, if breathing become exceedingly difficult, the air must be evacuated. (See Operation.)

HÆMOTHORAX is an effusion of blood into the cavity of the pleura, caused by wound of the lungs or intercostal arteries, by fracture of the ribs, or a cutting instrument.

Diagnosis.—If, following one of these accidents, there be dyspnoea, and dullness upon percussion (with or without spitting of blood), hæmorthorax may be generally inferred.

Treatment.—If the difficulty of breathing be extremely urgent, the operation of *paracentesis thoracis* must be performed to allow the blood to escape. (See Operation.)

HYDROTHORAX is an accumulation of water in the cavity of the chest, the result of idiopathic or traumatic inflammation of the pleura, heart, or lungs.

Diagnosis.—There is great difficulty of breathing, increased by lying down; livid countenance; disturbed sleep, and dulness on percussion: if the effusion be in one side only, the patient lies easier upon the affected side.

Treatment.—If the effusion produce great difficulty of respiration; then the operation of *paracentesis* may be performed to relieve the dyspnœa: but in cases of hydrothorax depending upon organic disease of the heart or lungs, little good can be effected by the operation; certainly nothing more than to prevent immediate suffocation.

Under no circumstances must both sides of the chest be punctured at the same time.

EMPYEMA is a collection of pus in the cavity of the thorax, the result of acute inflammation, whether idiopathic or traumatic.

Diagnosis.—In empyema there is dulness on percussion; gradual enlargement of the side of the chest; separation of the ribs, dyspnœa, difficulty of lying on the sound side, and more or less œdema of the parietes of the chest. If left to itself, the abscess may point and discharge externally between the ribs.

Treatment.—If the case be clearly one of empyema, the operation of *paracentesis thoracis* is called for: but if there be any doubt, two or three punctures may be made into the thorax, with a grooved or cataract needle, and a cupping-glass applied over them to extract fluid, which will make the case clear. (See Operation.)

HYDROPS PERICARDII, dropsy of the pericardium, may occur under the same condition as hydrothorax, and may even be combined with it.

Diagnosis.—Hydrops pericardii may be suspected if the patient complain of constant weight in the præcordia; dyspnœa, especially when lying on the back; faintness upon exertion; dulness on percussion, with evident fulness in the region of the heart, and if its pulsations be tremulous and the circulation embarrassed. This disease or condition, is often mistaken for hydrothorax.

Treatment.—The operation of *paracentesis pericardii* has been practised, although it cannot be of much benefit, and is not advisable. The only safe treatment, is to endeavour to promote absorption.

WOUNDS AND CONTUSIONS OF THE PARIETES OF THE CHEST require the same treatment, if the ribs be, or be not fractured.

A bandage, with an aperture to admit dressing the wound, must be firmly applied around the chest, to prevent motion of the ribs. Venesection, purgatives, and low diet to arrest inflammation, and opiates to allay irritation and cough.

PENETRATING WOUNDS OF THE CHEST, without wound of the lungs, are rare. When the chest is opened the lung collapses in some cases, as it would in the dead body; in others, it does not recede from the external opening, but may even protrude through the wound.

Treatment.—If the lung protrude from the wound in the chest, it must be returned by gentle pressure, and retained within by compress and bandage; if it cannot be retained, it must be allowed to slough. Foreign bodies must be removed, bleeding restrained, and the wound closed: if the intercostal artery be wounded, it must be tied, if possible, even though the wound has to be enlarged for this purpose. Bleeding and the other measures recommended in such cases, to arrest inflammation, must be employed.

WOUNDS OF THE LUNGS are attended with threefold danger. *Hemorrhage*, which may destroy life by inanition, or cause suffocation, by filling up the air-passages. *Inflammation*, which is sure to supervene from the injury, and may be aggravated by extraneous bodies. *Suppuration*, which may be profuse, and attended with cough, debility, hectic, and all the symptoms of phthisis.

Diagnosis.—There is dyspnœa and a sense of suffocation; pallid and anxious countenance; expectoration of florid arterial blood, which is coughed up in mouthfuls, mixed occasionally with clots.

Prognosis.—This must be guarded, for these wounds are dangerous, and often prove fatal; yet recovery is not uncommon after severe wounds of the lungs. There are good hopes of recovery, if the patient live through the first twenty-four hours.

Treatment.—Free venesection from the arm is necessary to arrest the hemorrhage from the wounded lung, provided the patient be not already exhausted by loss of blood. The wound should then be examined, and clots of blood and foreign bodies removed; if

the wound be not sufficiently large to admit of this, it should be enlarged with a probe-pointed bistoury, for it is important to remove splinters of bone and irritating substances from the chest: if an intercostal artery be wounded, it should be secured by ligature. The wound should then be closed with lint, plaster, and bandage, and the patient kept perfectly quiet; with plenty of cool air and light covering: he should be placed upon the wounded side, to allow a free discharge from the wound externally. It is often the case that, after a few hours, the pain, cough, and spitting of blood return. Upon the appearance of these symptoms, venesection must be again resorted to, and repeated as often as this state of things recurs, for it is our only hope. During several days the diet must consist of acidulated drinks and barley-water: the bowels kept open, and opiates given to allay cough, pain, and irritation.

Secondary hemorrhage is caused either by inflammatory action, by the separation of sloughs from the lung, or by the sloughing of an intercostal artery, which may have been contused by a ball or other substance. Hemorrhage from an intercostal artery must be arrested by ligature, or by pressure: from the two former conditions, venesection must give relief.

After the primary dangers have passed, if it be found necessary to perform the operation of *paracentesis thoracis*, it should be performed at the site of the wound, if done soon after the occurrence of the injury: but if it be at a later period, then it must be performed at the usual place. (See Operation.)

Foreign bodies in the chest add greatly to suppuration; they should therefore be removed, if possible, even though it be necessary to cut away part of the upper border of a rib, to accomplish it: balls, for example, have been known to remain and roll about loosely in the cavity of the pleura.

Penetrating wounds of the chest should always be closed; notwithstanding all surgeons do not recommend this measure.

Hennen very wisely observes, "If the patient, is placed with the wound in a dependent posture, the exit of effused fluids is not necessarily impeded. If they exist in large quantity, the wound is effectually prevented from closing; if the flow is so minute as to

admit of the union of the wound, the quantity effused is within the power of the absorbents to remove."

After wounds of the chest, there is a constant susceptibility to inflammation from slight causes; for which reason the patient should avoid all excesses, and exposure to inclement weather.

WOUNDS OF THE HEART almost always prove fatal, from hemorrhage. There are many instances, however, where patients have recovered from wounds of the heart by cutting instruments and musket-balls.

Diagnosis and Prognosis must of necessity be doubtful.

Treatment in this case consists in perfect quiet; free depletion, and the use of opiates, so that the blood may coagulate, and the wound become adherent, and organized by the deposit of fibrin.

SURGICAL DISEASES OF THE MAMMA.

MAMMITIS.—Acute inflammatory action in the mamma may result from external injury, or exposure to cold; but most generally it is connected with lactation.

Diagnosis.—Pain and all the signs of local inflammation are intense: fever is proportionally severe, and suppuration seems unavoidable. The secretion of milk at first is perverted, then entirely arrested. When matter is formed, it is seldom limited to one part; but gradually pervades the whole gland, and points very slowly: the abscess, after it has opened, is liable to degenerate into a sinus.

Treatment.—Active local depletion by leeches; anodyne fomentations, with the gland supported by a bandage, shawl, or handkerchief, and the administration of repeated doses of sulphate of magnesia and antimony.

If matter be formed, an early incision into the gland, to evacuate it, will save much trouble. In neglected cases, sinuses form which communicate with each other, intersecting the whole gland: in this condition it is not necessary to open each sinus, but merely to make sufficient counter-openings to allow the pus to escape, and

then, by pressure, secure contraction and adhesion of the cavities and discussion of the morbid parenchyma of the gland. Pressure may be applied by bandage, or by the skilful application of strips of adhesive plaster; compresses being used in both cases, when required.

CHRONIC MAMMITIS.—The mamma is subject to enlargement and induration by a slow, painless, and subdued inflammatory action. In some cases the whole gland is affected, in others only a part. Young adults are most liable to this affection.

Diagnosis.—The swelling is more diffused than any form of genuine tumour; not painful upon being handled, feeling as if it were composed of numerous small granules, and is entirely without the local and constitutional signs of carcinoma.

Treatment consists in the use of local antiphlogistic means, followed by discutients, to be persevered in for a long time; also attention to the general health, and to the uterine functions, by alteratives and tonics.

CHRONIC ABSCESS is often found of a peculiar character in the mammary gland; consisting of a thin, firm cyst, filled with a thick, cream-like pus, which may exist for months or years, enlarging very slowly if at all.

Diagnosis.—This abscess is difficult to diagnose; it is sometimes situated in the gland, and sometimes beneath it; indeed this is generally its site: it is firm to the touch, from being tense, and in this way closely simulates a solid tumour, and has often been mistaken for one.

Treatment.—The matter must be evacuated; this may be done, either by direct puncture of the abscess, or by sub-integumental puncture; followed by pressure to insure adhesion of the walls of the abscess.

LACTEAL ENLARGEMENT.—The lacteal tubes are liable to distension by occlusion of their orifices; giving rise to a swelling analogous to ranula. During lactation the contents of the tumour are milky; at other times they are serous. The swelling is fluctuating and extends like radii, from the nipple outwards; it has often a conical form, with the apex towards the centre.

Treatment.—The tumefaction should be punctured near the

nipple, and the opening kept pervious. If obliteration of the tube take place, by inflammation ; it should be considered a favourable termination.

HYPERTROPHY OF THE MAMMA is liable to occur at the age of puberty, and is usually connected with an unsatisfactory state of the menstrual secretion : there is sometimes connected with it, a state resembling nymphomania.

Treatment.—Local depletion, attention to the general health and uterine functions, with discussives, and pressure applied to the gland, are the necessary means for the cure of this affection.

Partial Hypertrophy, called by Cooper the “chronic mammary tumour.” In this case a portion only of the gland undergoes enlargement and ultimate change of structure : this is simple in its character.

Diagnosis.—The enlargement of the lobules generally takes place from the outer surface, and constitutes a soft unequal tumour. It is peculiar to the young adult, seldom appearing after thirty years of age. It is almost always connected with the uterine system.

Treatment.—The management of this case is the same as that recommended for general *hypertrophy*. Marriage, followed by pregnancy, often proves successful in curing this derangement. But this simple tumour is liable to degeneration ; therefore, should the means employed for its discussion fail after due trial, it must be regarded as all other tumours not amenable to other cure than the knife, and be extirpated.

The mamma is liable to various tumours ; as fibrous tumour, cystic sarcoma, true hydatids, and many malignant tumours, especially carcinoma. All attempts at discussion having failed with these tumours ; there is nothing left but extirpation that can procure relief, and this should be early resorted to in tumours of malignant character.

Tumours external to the mamma, but not incorporated with it, are not at all uncommon. These tumours are mostly simple, yet they are sometimes malignant.

Treatment.—If discussives fail, the knife must remove them. When this kind of tumour is simple, it should be removed without

disturbing the gland ; but if it be decidedly malignant, then the gland and tumour should be extirpated together.

AFFECTIONS OF THE MAMMILLA.—The nipple, both of the male and female, are liable to *hypertrophy*, and malignant disease.

Treatment.—In hypertrophy not much interference is called for ; but where the nipple is the seat of malignant disease, it is necessary to extirpate both the nipple and the gland.

Fissure and excoriation of the nipple of nurses, is a frequent and distressing affection.

Treatment.—The same applications are necessary for the cure of this affection, as are employed with irritable and inflamed sores in other situations. During the application of the child, the nipple should be protected by a shield.

SURGICAL DISEASES AND INJURIES OF THE ABDOMEN.

BLOWS ON THE ABDOMEN, from spent shot, passage of cart-wheels, or other causes, produce various results. They may cause severe and fatal *concussion and collapse*, or may be succeeded by inflammation, or pass off without any injurious consequences. They may also produce laceration of the bowels, or even of the solid viscera ; with an effusion of their secretions, or of blood, into the peritoneal sac.

Diagnosis.—When there is a well-marked shock communicated to the system, and the pulse is weak, and the patient complains of excruciating pain radiating over the whole abdomen, the effusion of blood, or the escape of the secretions of the abdominal viscera into the peritoneal sac, may be suspected.

Treatment.—During the stage of collapse nothing must be done. It is a common error in practice, to attempt to assist nature, by giving stimulants to dissipate the shock, or depression under which the system labours, upon the receipt of these injuries ; in this case the same bad effects are produced by interference, as in similar cases of injury to the brain. Mr. Miller earnestly invokes caution upon this point, and says, “ Let the patient alone ; and ere reaction,

with its quickened and full circulation occurs, a torn liver or spleen may have had its vessels closed by nature's hæmostatics, and a ruptured portion of intestine may be so circumstanced by position and exudation, as to render fatal escape of its contents into the peritoneal cavity at least less probable." It should be borne in mind, however, that the shock may be sufficiently severe to extinguish even the last spark of life; thus rendering all after treatment unavailing, unless nature be stimulated at the first moment. These cases must, therefore, be selected with a discriminating judgment, and even then stimulants should be administered with a sparing hand; remembering that though called for at the time, yet it is evidently adding fuel to the flame.

Absolute rest must be enforced: on the first rising of the pulse beyond the limits of moderate reaction, or as soon as pain, vomiting, and other signs of disorder of the system come on, the patient should be bled freely; following this by calomel and opium as circumstances may require: the bowels should not be moved for about three days. Leeches and fomentations to the belly are sometimes useful. Nothing in the form of nutriment should be taken for several days, except the mildest fluids.

ABSCESS OF THE ABDOMINAL PARIETES sometimes occurs spontaneously, but is more frequently the sequence of contusion, or punctured wound; in some systems, a slight blow suffices to produce it.

The site of the abscess is generally between the abdominal parietes, and may be either deep-seated or superficial; it is generally the former.

Diagnosis.—At first there is a hard, tender, gradually increasing tumour, which, as it increases in size, obscurely softens, and slowly becomes obtusely acuminate.

Treatment.—In the early stages of the tumour, discutives may be used with care. As soon as the formation of pus is indicated, a free incision should be made; indeed some surgeons recommend an incision into the most prominent point of the tumour, before pus is formed, to avoid the great danger of the abscess pointing inwards, ulcerating through the peritoneum and discharging into the

cavity of the abdomen, or it may even ulcerate through the intestine, bound down as it is externally by the thick fibrous tissue of the abdominal walls.

TUMOURS OF THE ABDOMINAL PARIETES.—These demand early attention, lest, by enlargement, they extend to the deeper layers and involve the peritoneum. The adipose tumour is oftener found in this locality than any other.

Treatment.—If discutives fail, extirpation must be resorted to.

ABDOMINAL ABSCESS.—Chronic abscess of the pelvic region is frequently met with: it is sometimes evidently the result of internal inflammation, but more frequently it is obscure and unconnected with any assignable cause: occasionally, it is owing to a perforating disease of the hip joint.

Treatment.—This abscess, when in its nascent state and unconnected with disease of bone, may be discussed by means of rest, the internal use of iodide of potassium, and the ordinary outward applications. When this abscess is so far advanced as to render diagnosis beyond doubt, then the matter should be evacuated, either by direct, or valvular incision, and treated as abscess in any other situation.

ABDOMINAL TUMOURS.—All the abdominal organs may be the seat of tumour: detection and discrimination between them is only to be effected by careful manipulation and good judgment.

Treatment.—Some of these tumours are discussible by ordinary means, but the majority of them are irremedial. By general treatment alone, is there a hope of delaying their progress; thus favouring the efforts of nature in spontaneous cure.

OVARIAN TUMOURS are probably oftener met than any other variety within the abdomen. They are generally cystic in structure, and may be solitary or not; multilocular or monolocular, either attached by a broad base, or a narrow peduncle, loose or movable, of small or large size.

Treatment.—When the ovarian tumour consists of a cyst filled with serum, it is capable of cure by general treatment, by tapping, pressure, and the application of other discutients. The solid form of ovarian tumours are not to be discussed; they should be let alone, and their effects palliated by treatment. These tumours

have been extirpated, but this operation is not generally practised, notwithstanding it has been performed with success.

ASCITES, OR DROPSY OF THE ABDOMEN, may be the result of inflammation of the serous membrane of the abdomen, but is oftener connected with, and arises from extensive disease of the liver. Ovarian dropsy has been mentioned, and as these two enlargements call frequently for the operation of *paracentesis abdominis*, it is desirable to make a good distinguishing *diagnosis* between the two disorders: to do this requires care, since the resemblance between them is strong, and sometimes the two diseases coexist.

Diagnosis.—In ovarian dropsy the swelling is not uniform, as in ascites, and is of various hardness. In ascites, the fluid occupies the most dependent part, the small intestines correspond to the umbilical region, the arch of the colon and stomach occupy the epigastrium; therefore, percussion over the hypogastric and lumbar regions, elicits a dull sound; but over the umbilical and gastric regions, a clear sound is returned. In ovarian dropsy, at no part of the abdomen is a clear tympanitic sound elicited; the cyst occupying the anterior part of the abdomen, whilst the intestines are pressed posteriorly. In ascites, fluctuation is the more decided: in ovarian dropsy, dulness on percussion.

In ascites the neck of the uterus is in its normal position; in ovarian dropsy, the uterus is drawn upwards, so that it cannot be felt, and the pelvis is occupied by part of the tumour.

In ascites the general health is affected, and there is general anasarca of the extremities; in ovarian dropsy, neither of these conditions exist. The history of the two diseases differs also: in ascites the swelling is general from the first, but in ovarian dropsy the swelling is confined to one side, and from this point extends over the abdomen.

Treatment.—When these diseases advance so far as seriously to interfere with respiration, or threaten suffocation by pressure upon the diaphragm, (which is sometimes the case,) then the only means of relief is by the operation of *paracentesis abdominis*. (See Operation.)

WOUNDS OF THE ABDOMEN.—When wounds of the abdomen implicate the viscera, they are attended with much danger. If the

liver be wounded, serious hemorrhage is likely to occur. Wounds of the gall-bladder create peritonitis, from the escape of bile. Wounds of the bladder, causing infiltration of urine, are almost always fatal. In wounds of the kidney there is a double danger, from hemorrhage and infiltration of acrid matters into the peritoneum. Injury of the intestines, too often gives rise to fæcal extravasation and fatal inflammation. With injuries of this grave nature the shock to the system is extreme, and sometimes fatal; therefore the prognosis is exceedingly unfavourable in wounds of this character.

Wounds of the abdomen may consist in simple solutions of continuity of the walls of the abdomen, or wounds of the viscera, or wound of the walls with protrusion of the viscera: lastly, with wounds of the viscera conjoined with protrusion.

Diagnosis and Treatment in these cases depend upon the nature and extent of the hurt. In simple wound of the walls of the abdomen, there is no difficulty in seeing the extent and proper management of the case. Nothing more is necessary than to bring the edges of the wound together by sticking plaster, or, if it be necessary, a few stitches of the interrupted suture can be applied. In cases with division of the epigastric artery, the vessel must be secured by a ligature, and if it be necessary to enlarge the wound, or cut down for this purpose, it must be done. In wounds of the viscera without protrusion, it is difficult to satisfy the mind positively on this point; but it is not of much importance in determining the treatment, for it is the same whether they are wounded or not.

WOUNDS OF THE STOMACH may be known by the position of the wound, vomiting blood, great depression, and by the kind of matter that escapes from the wound. Wounds of the intestines may be strongly suspected if blood pass with the stools, or by the symptoms of extravasation of their contents into the peritoneal sac, as excruciating pain, radiating from the seat of injury, with signs of great collapse. Yet Mr. Travers has shown that wounds of the intestines do not always give rise to extravasation of fæcal matter, unless the wound be very large; therefore the absence of these symptoms does not make it clear by any means that the intestines are not penetrated. Extensive wounds of the *liver* are as fatal as

those of the heart, from its great vascularity; but patients may recover from small wounds of the liver. In these there will be symptoms of great collapse, succeeded by severe sickness, pain in the liver, with yellowness of the skin and urine, great itching, and bilious discharge from the wound. Wounds of the *gall-bladder* are almost universally fatal. If the *spleen* be deeply wounded, fatal hemorrhage follows. Wounds of the *kidneys* may be suspected from the position and direction of the wound and a discharge of bloody urine. This accident is dangerous from three causes,—hemorrhage, inflammation, and excessive continued suppuration.

Treatment in all these cases is to be conducted on the principles already laid down in cases of wounds. Venesection is to be resorted to for the arrest of visceral and internal hemorrhage, as well as to arrest inflammation. In wounds of the *kidneys*, the proper management of the case consists in venesection, mild laxatives, warm bath, light dressings to admit the flow of urine by the external wound, and protection of the skin from excoriation by the urine.

In wounds of the *bladder* communicating internally, a catheter should be passed into the viscus through the urethra, and continued until the wound unites.

When the intestines protrude from the abdomen, but are neither wounded nor gangrenous, they must be cleaned and returned at once to the abdominal cavity, the external wound closed, and the patient placed in bed upon his back, with the knees drawn up and shoulders elevated.

When the *stomach* and *intestines*, protruding, are found to be cut, it is recommended by surgeons to sew up the wound with a fine needle and silk, with the *continuous*, or *glover's suture*. In sewing up intestine, care should be used, so as to bring the edges together in such manner as to oppose the two surfaces of the outer or serous membrane to each other, since mucous surfaces do not adhere. In a very short time the ligature is enclosed by organized fibrin, and gradually ulcerates through the intestine until it drops into the interior of the gut, and is passed per anum at the time nature has completed the repair from without. If the whole of the protruding intestine should be found gangrenous, it should not be returned to the abdomen, but on the contrary be left hang-

ing out; the only resource left in this case being the formation of an *artificial anus*.

In no case of wound of the intestinal tube should the bowels be disturbed by cathartic medicines. If they be loaded with fæces, the only safe remedy is enema of warm water.

The after treatment, in all cases of wounds of the abdomen, is the same. Perfect quiet of body and bowels must be insisted upon; venesection and leeches to arrest hemorrhage and to avert inflammation, the indication for bleeding being taken rather from the stomach than the pulse, for the pulse, in inflammation of the peritoneum and intestines, is small and often weak. But where there is vomiting in these cases, it should be taken as an indication for bleeding. The patient must be laid down, with the site of the wound, as a general rule, the most dependent, to allow the escape externally of fluids. After bleeding, large doses of opium may be given, keeping the system under its influence.

ARTIFICIAL ANUS is an unnatural opening of the intestine through the abdominal parietes, and by which orifice the fæces are discharged externally. It may be the sequence of a penetrating wound, an abscess or ulceration of the intestines, or sphacelus of the gut from strangulated hernia. From whatever cause it may arise, the external opening is irregular, everted, red, and the surrounding skin is excoriated by the discharge. The intestine adheres to the peritoneum by its serous coat at the margin of the external opening, and thus extravasation of fæces into the abdominal cavity is prevented. The intestine, now converted into two tubes, meets at the artificial anus, at an angle more or less acute, and presents two orifices, from one of which matter passes out in its descent from the stomach; the other leads to the rectum. The two orifices are divided by a crescentic septum, from adhesion of the two walls of the intestinal tube, which lie in contact.

The consequences of artificial anus are both dangerous and disgusting,—dangerous, since the patient may suffer from inanition, particularly if the aperture be near the duodenum, and the intestine may protrude and cause hernia;—disgusting, from the constant escape of flatus and fæcal matter.

Treatment.—In cases of recent origin, the patient must be kept

in bed and the parts be kept clean; in this way the parts may contract and cicatrize. In cases where there is a small orifice, compression and engrafting a piece of skin over the opening should be tried. Enemata are always useful in this condition. As a palliative, a pad of linen or lint can be worn to compress the orifice and prevent discharge, or a hollow truss, with a horn receptacle, may be used with advantage. But in cases where the orifice is large, or of long standing, nothing is left but to try the operation for artificial anus. (See Operations.)

HERNIA.

In surgery, the signification of the term *hernia* is generally restricted to an escape of intestine, or omentum, from the cavity of the abdomen.

The point of egress selected by the hernia, giving it a particular name, to express its position; as, inguinal, ventro-inguinal, femoral, umbilical, ventral, phrenic, perineal, vaginal, labial, obturatorial, and ischiatic, are distinctions according to the anatomical relations of the parts. Others distinguish the nature of the substance protruded; as, enterocele, epiplocle, entero-epiplocle. Again, from the pathological condition of the parts; as, reducible, irreducible, incarcerated, and strangulated.

There is no injury or disease, probably, to which the human family is liable, that occurs as frequently as hernia; and none that requires, upon the part of the surgeon, more careful study, anatomical knowledge, decision, and promptness; for, in other diseases of importance, time is not so pressing, and aid can be brought from a distance, or the patient can seek it; but here, it is often that relief must be rendered within the hour, or the patient is irrevocably lost.

The causes of hernia are predisposing and exciting.

The predisposing causes are, whatever weakens the abdominal parietes at any one point; natural want of closeness of development, as at the groin and navcl; rupture of muscle, tendon, or fascia. The predisposing and exciting causes may be the same;

as cough, straining, or long-continued exertion of the abdominal muscles, by pressing the contents of the abdomen against its walls, weaken and enlarge the natural outlets of the cavity, and thus tend to hernial protrusion.

Hernial contents.—Every abdominal viscus is liable to protrusion, but it is rare indeed to meet with any other than the protrusion of intestine or omentum. If it be *intestine* alone protruded, the tumour is designated an *enterocèle*; if it be *omentum* alone, an *epiplocele*; the descent of both being an *entero-epiplocele*.

Diagnosis.—Hernia, ordinarily, is a soft tumour, situated at one of the abdominal openings, which enlarges upon coughing and exertion of the abdominal muscles; if the protrusion be intestine, it may be returned to the abdominal cavity by pressure, retiring with a gurgling sound. But hernia may be mistaken for other diseases; it is necessary, therefore, to use much care in diagnosis. *Hydrocele* simulates hernia, but differs from it in being more or less translucent. Hernia is almost invariably opaque; the only exception being in case of descent of a large fold of intestine, distended alone by gas, and covered by thin integument. In hydrocele, the tumour is constant and undiminished by pressure; hernia is always varying more or less in size, and can generally be made to disappear by pressure. In hydrocele, a part of the cord can be felt distinct from the tumour, at its apex; in hernia, the cord is never distinctly felt in any part. Hydrocele, unless congenital, does not enlarge upon or feel the impulse of coughing, or exertion of the muscles of the abdomen. In hydrocele, the testicle can scarcely be felt, if at all; in hernia, it can be felt distinct and separate from the tumour, at the lower part of the scrotum. The history of the two diseases differs also: the hernial tumour appears suddenly, is developed above, and descends; hydrocele forms gradually, and is developed from below upwards. But these two diseases sometimes coexist. In *hydrocele of the cord*, the tumour is circumscribed, leaving a portion of the cord clearly to be felt above and below the tumour, and has most of the other distinguishing signs of hydrocele. But when that portion of the cord within the inguinal canal is the site of such serous effusion, the difficulty of diagnosis is great, for the tumour may be made to dis-

appear upon pressure. *Cirsocle* may be distinguished from hernia by the non-reducibility of the swelling, and its characteristic form, which is like a bunch of earth-worms. Yet it is like hernia, in diminishing during recumbency and under pressure; the tumour returns upon assuming the erect posture, even though the abdominal ring may be closed by pressure of the thumb. But when the enlarged veins occupy the upper part of the cord and inguinal canal, with an accumulation of serum, the diagnosis is extremely difficult. The enlargement of the veins of the cord often pave the way for hernial protrusion. *Bubo*, in history, feel, and progress, is different from hernia; but there may be enlargement of the inguinal glands, at the same time that there is femoral or inguinal hernia.

Descent of the Testicle, being unusually late, may be arrested in the inguinal canal; causing a painful swelling, similar to hernia; but may be distinguished from it, by the absence of the testicle in the scrotum, by the feel of the tumour, and by the characteristic pain produced upon pressure: this, like the high form of *cirsocle*, may give rise to hernia. From *Sarcocoele*, hernia may be distinguished, by the history of the disease, its negative signs on coughing, and freedom of the cord, except in some cases of malignant disease. *Psoas abscess* simulates femoral hernia, yet may be known by the history of the case, evidences of spinal disease, the distinct fluctuation in the swelling, and the site of the abscess being generally exterior to that of hernial protrusion. *Varix of the femoral vein*, when bulging and projecting through the saphenic opening, may be mistaken for femoral hernia; but with this diagnostic precaution, error may be with certainty avoided; reduce the tumour by pressure, with the patient in the recumbent position; then let him rise, firm pressure being continued upon the femoral ring: now if it be a case of hernia, this pressure prevents a reappearance of the tumour; if it be varix, then the swelling quickly reappears.

In strangulated hernia, the circulation is arrested by the pressure, and the patient feels violent pain in the region of the stomach, as if a tight cord were drawn round the body; frequent eructations; great desire for fæcal discharge, but only a small quantity of fæces is discharged from the large intestines; the tumour is hard

and if composed of intestine, it is extremely tender. Vomiting occurs; at first the contents of the stomach alone are discharged; afterwards bile, which regurgitates from the duodenum; if the strangulated portion be large intestine, fæces is sometimes thrown from the stomach. The pulse is hard, small, and quicker than natural. If the strangulation be not relieved, the vomiting becomes more frequent; costiveness continues; the abdomen is flatulent and tense; the tumour becomes harder, and more tender to the touch; the pulse more frequent, and smaller, but still hard. The *peritoneum*, becomes inflamed; the abdomen extremely tender to the touch, pulse very small, thready, and frequent; the vomiting and costiveness continue; hiccough sets in; the tumour becomes inflamed upon its surface, more tense, and the marks of the fingers often remain upon it for some time. Thus approaches the last stage, when the pulse frequently intermits; the patient is covered with a cold perspiration, his mind is less depressed and spirits much better; he has little or no pain, and entertains strong hopes of recovery. In this condition a discharge often occurs from the bowels, and death soon follows.

Incarcerated Hernia expresses that condition of parts wherein the protruded portions of the abdominal contents are retained in their abnormal position, without strangulation, or the occurrence of inflammatory action: reduction is not called for by the urgency of the case, and when this is attempted it is found to be impracticable with the existing condition of the parts. There are several reasons why this tumour cannot be reduced at once: as enlargement of the hernial contents: generation of gases; fluid and solid contents accumulating in large quantity; enlargement of omentum; the sac, thus enlarged, cannot repass the orifice by which it gained egress, yet the tumour may remain unaltered, and still cannot be returned; from the temporary contraction of the orifice.

Reducible Hernia, is that condition of the protrusion, which is capable of being readily returned into the cavity of the abdomen.

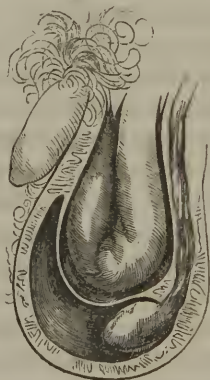
Irreducible Hernia, is that condition of the protruded viscera which, without inflammation or obstruction to the passage of fæces, and circulation, cannot be returned to the cavity of the abdomen. This inability to replace the hernial contents in the abdominal

cavity, may be owing to the growth of the protruded omentum or mesentery becoming too large to repass the orifice by which it emerged; to adhesion of omentum or intestine to the surface of the sac; membranous bands may form across the sac, or omentum may get entangled in the intestine, or a protruded cœcum to which the intestine adheres by cellular membrane behind, the sac only existing on the forepart.

The dangers of irreducible hernia, are rupture of the intestine by a blow; liability to strangulation, and the formation of abscess.

INGUINAL HERNIA.

Inguinal hernia is that form of protrusion which passes through one or both *abdominal rings*, and is divided into *oblique, direct, congenital*, and *encysted* inguinal hernia. Of these varieties the oblique is most frequently met with.



OBLIQUE INGUINAL HERNIA follows the course of the spermatic cord. It commences by a fulness, or tumefaction, at the internal ring, which is a little above the centre of Poupart's ligament; it passes then into the inguinal canal, where it receives the name of *bubonocèle*. The hernia gradually advances along the canal, passing through the external abdominal ring, and descends to the

labium in the female, constituting labial hernia, and into the scrotum of the male, and is called oscheocele, or *scrotal hernia*.

DIRECT, OR VENTRO-INGUINAL HERNIA does not follow the course of the spermatic cord, and is, therefore, not covered by the cremaster muscle, but bursts through the conjoined tendon of the internal oblique and transversalis muscles, opposite the external abdominal ring. Sometimes the tendon is distended, instead of ruptured, and pushed along before the protrusion, thus becoming one of the investing fasciæ of the hernia. In direct inguinal hernia, the epigastric artery is upon the outer side of the neck of the sac.

CONGENITAL HERNIA is a variety of oblique hernia which can only occur soon after birth, for the reason, that at this time the omentum, or intestine, passes out of the abdomen and down into the scrotum with the testicle, and into the very pouch of peritoneum, which forms the *tunica vaginalis testis*, anterior to the time of its obliteration from the peritoneal sac of the abdomen: consequently, the sac of this variety of hernia consists in the tunica vaginalis, having all the other coverings of the oblique variety: the intestine lies in contact with the testicle, to which it will adhere, if not returned to the abdomen.

ENCYSTED, OR HERNIA INFANTILIS, is a variety of the congenital; but the hernia in this case has, as it were, two sacs, and is therefore more complicated than the former. The communication between the cavity of the tunica vaginalis and that of the abdomen is shut at its upper part; but the former is unusually large, and ascends high on the cord, containing more or less serous fluid. Behind this a hernia descends, invested by the ordinary peritoneal sac.

In cutting down upon such a tumour, the anterior portions of the tunica vaginalis are divided first, and then the posterior, and after this, appears the sac with its contents; unless the former be incorporated with the posterior layer of the tunica vaginalis, which is not unlikely. This variety of hernia rarely occurs. In these cases the tunica vaginalis is liable to be the seat of hydrocele.

FEMORAL, OR CRURAL HERNIA is that form of protrusion which passes through the *crural ring*, and is bounded internally by

Gimbernat's ligament; externally by the *femoral vein*; anteriorly by *Poupart's ligament*, and posteriorly, by the bone.

The hernial protrusion passes down behind the falciform process of the fascia lata, and perforates the cribriform plate of this fascia at the *saphenic opening*; as it increases in size, after passing through the fascia lata, it ascends and gains the anterior surface of Poupart's ligament; thus winding almost completely round this ligament.

Diagnosis.—Femoral hernia simulates *psoas abscess*, in dilating when the patient coughs, and diminishing in the recumbent position. Psoas abscess may be distinguished from hernia, in being generally more external; by yielding a sensation of fluctuation, and not being tympanitic; it is attended also by symptoms of disease of the spine.

Varix of the femoral vein also simulates this hernia, in dilating upon coughing, and diminishing upon assuming a horizontal position; but upon rising, even though firm pressure be made below Poupart's ligament, the tumour quickly reappears; a symptom which can not occur if it depend upon hernia.

Bubo and other Tumours of the Groin may easily be recognised by their general character and history, and being unattended with general disturbance of the abdomen. But if, with these appearances, there be symptoms of strangulation, the tumour should be cut down upon, to ascertain its true character: for the best surgeons have failed in diagnosis in such cases.

UMBILICAL HERNIA, or EXOMPHALOS, is a protrusion through the umbilicus, and is generally met with in young children and women who have borne many children. In adults hernia at the umbilicus seldom occurs; the protrusion generally taking place, in these, by rupture of the abdominal parietes, near, not at, the umbilicus.

VENTRAL HERNIA is a protrusion through the walls of the abdomen, at any other point than those already named, to designate, or locate hernia; as the *lineæ semilunares*, or *lineæ transversæ*.

PERINEAL HERNIA is that form which descends between the bladder and rectum; passing through the pelvic fascia and levator ani muscle; forming a tumour in the perineum.

VAGINAL HERNIA is but a variety of the former ; where the hernial protrusion, instead of passing through the perineum, projects into the vagina and blocks it up.

LABIAL, OR PUDENDAL HERNIA is that form of hernia where the protrusion descends between the vagina and ramus of the ischium, and forms a tumour in the labia. This may be distinguished from inguinal hernia, by the absence of swelling at the abdominal rings.

OBTURATOR, OR THYROID HERNIA, passes through the obturator foramen, along the artery and nerve.

ISCHIATIC HERNIA protrudes through the ischiatic notch. This and the obturator are small and exceedingly rare forms of hernia.

DIAPHRAGMATIC HERNIA is a hernial protrusion from the abdomen, through the diaphragm into the cavity of the thorax : it is mostly congenital ; but may occur from separation, or rupture of the fibres of the diaphragm ; caused by a fall upon the abdomen, or violent pressure, which is capable of rupturing this muscle. If this hernia become strangulated, the ordinary symptoms of strangulated hernia will appear.

Prognosis.—Mr. Pott justly remarks, “ there is much variety in prognosis in this disease.” It is influenced necessarily by the age and constitution of the subject, date of the disease, by stricture or strangulation, and by inflammation ; the symptoms which accompany it, and the probability or improbability of its being returnable.

Sir Astley Cooper observes, that the danger of hernia is in proportion to the smallness of its size. If the hernia be large, it is more readily returned into the abdomen, is rarely strangulated, and if strangulated is more easily reduced. But if the hernia be very small, and the ring through which it passes extremely narrow, the hernia is liable to strangulation, and in this state is rarely reducible.

Treatment.—The treatment of hernia depends upon the nature of the injury ; whether reducible, irreducible, incarcerated, or strangulated.

Reducible hernia requires no other interference, than to return the protruded parts to the cavity of the abdomen, and there retain

them by compress and bandage, or pad and spring, when the situation is one that admits of the application of the truss.

Irreducible hernia is scarcely susceptible of radical cure; still a return of this protrusion has taken place, in cases where the patient has been long confined to his bed, and much reduced by fever; under these circumstances the tumour has retired into the abdominal cavity; but where this happens, the irreducible condition of the hernia depends upon fatty enlargement of omentum only: reduction of a hernia cannot take place if there be adhesion. The *palliative treatment* consists in supporting the tumour by a suspensory bandage, or a truss with a hollow pad, that firmly embraces the hernia, and prevents additional protrusion. The patient should avoid violent exercise, and keep the bowels soft.

Incarcerated hernia.—The treatment in this case must depend upon the cause: if this be accumulation of gas, the application of cold should be resorted to: solid, fluid, and gaseous matters, may be removed by purgatives and enemata; if the non-reduction depend upon fatty omentum, it must be reduced by pressure and low diet; by these means the diminished tumour may be returned to the abdomen, and retained there as in the reducible form. But this protrusion is not always so easily disposed of. If there be spasm, the warm bath, opium, and other antispasmodics must relieve it: inflammation must be reduced by the employment of antiphlogistics, followed by discutients: until the protruded viscera can be returned to the cavity of the abdomen; they must be carefully supported by a bag truss, and every possible precaution taken to avert strangulation; an accident to which this tumour is especially prone.

Strangulated hernia is more difficult to treat than the other varieties of hernia: if the tumour cannot be returned to the abdomen by taxis; then a resort to the knife is imperative, and our last hope of relief. (*See Operations.*)

DISEASES AND INJURIES OF THE RECTUM AND ANUS.

There is no class of diseases more frequently met with than this, and none certainly of more importance in general practice, and

probably there is no set of diseases so little studied ; cases, therefore, are met with in practice, that are exceedingly embarrassing, which would be very simple, if perfectly understood : too much attention cannot be paid to this subject.

PROLAPSUS ANI consists in eversion of the mucous membrane of the rectum ; or the gut entire, in some rare cases, is protruded, but the mucous membrane generally is alone everted. Infiltration takes place in the cellular tissue beneath the villous coat, thus pushing the mucous coat before it. This affection is mostly met with in children and old people ; it may depend upon a natural laxity of structure, or arise from habitual costiveness, straining at stool, diarrhœa, hæmorrhoids, stricture in the urethra, stone in the bladder, enlarged prostate, drastic purgatives, ascarides, and other causes. The size of the tumour is various ; it may be merely the annular border of the anus, or it may increase to the size of a child's head.

Treatment.—In the child, the affection can generally be cured by removal of the cause. The bowel should always be replaced immediately after its descent, the bowels regulated, and evacuations made in the recumbent posture. Crying should be avoided as much as possible. Cold water and astringents should be used externally and internally by injection. Iron and other tonics are usually indicated by general laxity of the system.

In the adult the protruded part should be returned without delay, by placing him upon his back, elevating the hips and shoulders, and pressing gently upon the tumour with the fingers, or if there be difficulty in returning it in this way, the fore-finger, oiled, should be pushed carefully into the anus, and it will carry the intestine with it. But it is not always possible to return the parts at once, owing to constriction, inflammation, and tumefaction. In this case rest, the application of leeches, cold, and other anti-phlogistic means must first be resorted to, before an attempt is made by pressure to return the part.

It sometimes happens that the parts, having been long protruded, become indurated and incapable of reduction ; it is then necessary to remove a portion of the tumour, either by the knife or ligature, before reduction can be effected. But great care and discrimination

are necessary in these cases, to avoid doing mischief with the knife. Where the part has been long protruded, disorganized, non-vascular, and has little connexion with the parts within the rectum, then it may be removed by incision, taking away one or more flaps, or the whole mass. When the tumour appears vascular, and is not large, it is better and safer to remove it by the silk ligature or wire and double canula, as practised in cases of hæmorrhoids.

The protrusion having been returned, either with or without an operation to accomplish this object, it must be retained by compress and bandage. For the manual management of these cases, *see Operations.*

In the treatment of prolapsus ani, much will depend upon the removal of the cause of the disease. The patient should be kept quiet, and sustained by a diet of mush and molasses. In bad cases the bowels should be evacuated in the recumbent posture, whilst the rectum is supported by pressure on the perineum, or upon the nates, to prevent the descent of the intestine.

Internal Prolapsus.—The upper part of the rectum sometimes becomes invaginated within the lower, giving rise to most of the symptoms of stricture of the rectum. The finger passed into the rectum comes in contact with a tumour, around which there is a *cul de sac*, the natural passage of the bowel being in the centre of the tumour. This makes the case at once clear to the mind.

Treatment consists in the use of aperients, astringent injections, and the introduction of a bougie, the point of which should correspond to the orifice of the prolapsed gut, then carried up gently, so as to push the intestine before it, and thus relieve the invagination.

FISSURE AND ULCER OF THE ANUS.

Fissures of the anus are exceedingly troublesome. A chap or crack forms on the verge of the anus, in the mucous coat of the bowel, sometimes including the skin around the anus. This is the cause of great annoyance, much pain, sometimes even agony, especially at stool. Spasm of the sphincter adds much to the discomfort, this being quite frequent in these cases, making

great difficulty upon examination, by closing the fissure through muscular contraction.

This affection often arises from long-continued dyspepsia, or disorder of the primæ viæ.

Treatment.—The cause should be removed, if possible. The functions of the mucous membrane must be attended to, and noxious matters removed from the bowels. Calomel, followed by laxatives and alteratives, according to circumstances, should be administered. The fissure should be touched with the nitrate of silver, the nitrate of mercury, or strong aqua ammonia. Local pain can be relieved by belladonna ointment or fomentation of poppy-heads, or a warm poultice and laudanum. If this treatment fail, then a slight operation is required to effect a cure. A probe-pointed bistoury is carried into the anus on the fore-finger, and an incision made through the mucous coat and fissure, converting the fissure into a simple incised wound, which generally heals quickly. This slight operation sometimes fails, and then it is necessary to resume the knife precisely in the same way, and instead of merely cutting through the mucous membrane and fissure, to carry the incision entirely through the sphincter ani muscle, and thus lay the parts entirely at rest, which gives time for the fissure to cicatrize. The importance of regulating the stomach and bowels should be constantly borne in mind in these cases.

Simple ulcers of the mucous membrane of the anus are liable to assume an irritable condition. They produce the same symptoms as fissure, and should be managed in precisely the same way. Ulcers of the mucous membrane are more difficult to see than fissure, being generally situated higher up; but by the aid of a speculum both diseases can readily be observed by the eye. Ulcers may be felt by the finger, when passed into the anus, the ulcer conveying to the touch a peculiar feeling, which, added to the pain experienced by the patient when the ulcer is touched, serves to form a correct diagnosis.

A broad, deep ulcer often fixes itself at the posterior part of the rectum, just in front of the coccyx. This ulcer is often half an inch wide. It is curable by the same means as the former diseases of the anus.

SCIRRHOUS ULCER OF THE RECTUM, according to Mr. Mayo, destroys the mucous membrane to a certain extent, leaving the muscular coat exposed, which is pale, hard, and gristly, like cartilage. There is great pain, tenesmus, fætid discharge, and irritation of the bladder.

The *treatment* consists in the use of aperients, astringent and opiate injections, and the occasional passage of a bougie.

FUNGUS MEDULLARIS is accompanied with all the symptoms of permanent stricture. This disease may be recognised by the projection of the fungous mass.

Treatment.—The bowels must be kept soft, pain and irritation allayed; and to arrest contraction of the calibre of the rectum, the bougie should be occasionally passed. Extirpation of this tumour should not be attempted; but it may be necessary in some cases to cut through the tumour, to allow passage to the fæces.

PRURITUS ANI.—Itching of the anus is a very troublesome affection.

Treatment.—The bowels should be kept open by laxatives; the stomach and intestines put in good condition; the part bathed in water as hot as can possibly be endured; and nitrate of silver, weak solution of corrosive sublimate, citrine ointment, tincture of iodine, or strong aqua ammonia applied to the itching surface.

WARTS, and other excrescences about the anus, that depend upon local irritation, should be removed by the knife, scissors, or the application of nitrate of silver. After being removed by the knife, astringent lotions or nitrate of silver must suppress rising granulations.

INJURIES OF THE RECTUM.—The anus like other parts of the body, is liable to be bruised and wounded. A bruise may be serious from the inflammation it excites, and the latter by hemorrhage.

The *treatment* here must be the same as that recommended in other cases of inflammation and hemorrhage of the rectum. If the hemorrhage be profuse, endangering life, the rectum must be plugged up with lint, or injected with cold water, or probably the best means of arresting the hemorrhage is, to introduce into the rectum a portion of bladder, and distend this with cold water, or stuff it with tow, lint, or cotton; so as to produce sufficient pressure to ar-

rest hemorrhage, and give time for coagulation of the blood. The bowels should be closed up by the use of opium, and abstinence from food for several days.

HEMORRHAGE FROM THE RECTUM.—Idiopathic hemorrhage from the lower bowel is one of the indications of piles; particularly of the internal vascular pile, which is mostly arterial. It is generally a mere exhalation of blood, consequent upon congestion of the mucous membrane; this discharge in part takes place from the surface of the hæmorrhoids, covering the fæces, without mixing with them. Hemorrhage occurs, sometimes from the rectum of females, where piles are absent; exuding from the congested mucous membrane, or a small vascular eminence, on some part of this membrane, and is generally discernible by the use of the speculum. This variety of hemorrhage may be periodic and vicarious, or frequent and exhausting.

Treatment.—This must be directed to the removal of the cause. Hæmorrhoids should be ligated: vascular projections cauterized: the uterine functions restored, and the general health improved: cold, astringent, and styptic injections administered, and astringents and tonics given internally.

Discharges of mucus, clear and viscid, without fæcal odour, sometimes occur from the anus. These may be created by irritation of the rectum from any cause; but especially by piles, and ascarides.

It is easily corrected by the use of mild aperients, copaiba, and astringent injections.

IRRITABLE RECTUM, is a troublesome affection to which the lower bowel is subject, without structural change, arising from irritation; as ascarides, stricture in the urethra, stone in the bladder, or an altered condition of the mucous membrane of the stomach or upper bowels.

Treatment.—The first and principal object is to remove the cause: after which opiate and hydrocyanic injections may be used; accompanied with the employment of laxatives.

RECTITIS.—The rectum, like other portions of the system, is liable to inflammation. It may arise idiopathically, or from external injury, lodgment of foreign bodies, exposure to cold, an ex-

cited condition of piles, or of extension of inflammation from a contiguous part.

Diagnosis.—In acute cases, the symptoms are severe. The part is swollen, and exquisitely painful: spasm of the sphincter, which produces agonizing torture: there is burning, intense heat in the rectum, whilst the discharge from it is scalding: these symptoms are accompanied by fever. The urinary organs are much disturbed: micturition is painful, accompanied by frequent stranguery, and even retention of urine sometimes occurs.

Prognosis, should be guarded: resolution may take place with free mucous discharge, or hemorrhage, or it may be slow and incomplete: ulceration may occur, either confined to the mucous membrane, spreading over a large surface, or circumscribed; perforating the coats of the intestine, giving rise to abscesses in the adjoining cellular tissue, and the formation of fistulæ. The action may be less active; creating thickening of all the coats, and the establishment of organic stricture of the rectum.

Treatment.—This is a matter of great importance to the patient. The first step is to ascertain and remove the cause. The patient must be placed upon his back, and copious depletion made at once, by leeches to the perineum and sacrum: no purgative medicine is to be given; enemata of a gentle character, if required, may be administered: after washing the bowel by a mild enema, an injection of nitrate of silver, gr. x or xx to the 3j of distilled water, will be found exceedingly beneficial in arresting the inflammatory action. Opium should be administered to allay spasm, and to quiet irritation of the urinary organs: constant hot fomentation of the part with poppy-heads is very grateful to the patient.

ABSCESS EXTERIOR TO THE RECTUM, is seated in the cellular tissue, and is generally the result of acute inflammation, affecting adolescents, or young adults of weak constitution. This abscess may be seated in the nates, pointing early, and may not be attended with much constitutional disturbance: this form does not tend to burrow near the bowel; it generally gets well under the simplest treatment. Or it may be situated deeply, and not more than a couple of inches from the bowel; burrowing near it. In this position the pain is great, with considerable constitutional disturb-

ance: evacuation of the bowels is attended with difficulty, and suffering.

Diagnosis.—Early in the case fluctuation cannot be perceived, but there is perceptible hardness upon firm pressure being made with the finger beside the anus and within the rectum; throbbing pain continues; the hardness enlarges; after a time, softening in its centre may be perceived; pus forms rapidly, and reaches the surface slowly; indeed, it may approach the exterior surface so tardily that, ere this occurs, the intestine gives way, being ulcerated through, and the abscess is imperfectly discharged per anum.

Treatment.—The first object of remedial interference is to discuss the tumefaction by arresting the inflammatory action. Failing in this, discharge of the pus externally is next to be attempted: this may be aided by the application of emollient poultices. The moment fluctuation or softening is perceived, a lancet or bistoury should be passed into the abscess, to evacuate the pus. After the evacuation of the abscess, the general health should be improved by tonics; without this it will be found difficult to close the wound or prevent recurrence of the disease. If this abscess be connected with phthisis, it may not always be advisable to close it.

FISTULA IN ANO is a sinus or fistulous tract beside the rectum and sphincter ani muscle. There are three forms of fistula in ano, viz.: *complete fistula*, which has an opening externally in the perineum, and another communicating with the interior of the rectum above the sphincter muscle; *blind external fistula*, which has an opening externally, but does not communicate with the rectum, although it generally reaches its coats; *blind internal fistula* communicates with the bowel by an opening, but has no external orifice in the perineum, although there is a hardness and redness near the anus, which indicates its position.

According to Sir B. Brodie, the origin of fistula in ano is an ulceration of the rectum, and an escape of fæcal matter into the adjoining cellular tissue; this gives rise to abscess, and fistula is the result. Mr. Ribes says the internal orifice of this fistula may always be found about an inch and a quarter from the anus. Consumptive persons being subject to ulcerations of the lower bowels, fistula in ano is of common occurrence in these subjects;

which fact seems to support the position of Sir B. Brodie. There may be one or many tracts to the fistula; several may communicate with one main channel, or they may each have a separate external orifice.

Treatment.—The only effectual treatment in this disease is division of the sinus and sphincter ani muscle. (See *Operations.*)

HEMORRHOIDS, OR PILES.—This disease consists in tumours about the anus, composed of varicose veins and hypertrophied cellular tissue.

Predisposing Causes.—Whatever tends to determine blood to, or prevent its return from the rectum, predisposes to the disease. Therefore, habitual costiveness, pregnancy, all kinds of abdominal tumours, torpor or disease of the liver, sedentary occupations, and tight stays, predispose to this disorder.

The *exciting causes* are, irritation of the lower bowels; as irritating drastic cathartics, exercise on horseback, exposure to wet and cold. Piles more frequently occur in women than in men, being rare in both sexes under puberty.

Piles are *internal* or *external*; the former when they are situated within the rectum, the latter when without and around the anus.

External Piles are composed of a congeries of varicose veins, surrounded by hypertrophied cellular tissue; covered partly by mucous membrane, and partly by loose rugose integument. If ulceration penetrate to the interior of these tumours, they constitute *bleeding piles*, or they may be *blind*, that is entire, when they do not discharge blood. There may be but one tumour; usually more than one exists. These tumours may take on inflammatory action, or remain indolent.

The *Internal Pile* may be of the same structure as the external, or consist almost entirely of varix of the hemorrhoidal veins, or they may be of the nature of sarcoma, and more or less pendulous in their form; but they are more frequently of the nature of erectile tissue. The tumour usually has a broad base of attachment, the surface sometimes resembling the strawberry.

Treatment.—The general treatment is to be directed to the removal of the predisposing and exciting causes. If the patient be of full habit, he should live abstemiously, and take plenty of exercise;

the bowels should be kept soft by aperient medicines, and a diet of mush and molasses is one of the best that can be recommended. If the piles be inflamed, leeches should be applied to the anus, or cups to the sacrum; a dose of calomel and opium at night, followed, in the morning, by castor oil; low diet; rest in the recumbent posture; warm fomentations of poppy-heads, poultices, or immersing the part in cold water, and the application of astringents. If the introduction of a pipe can be borne, enemata of cold or warm water may be given; cold usually gives more relief than warm water.

Generally these tumours do not show themselves externally, except at stool, and if not replaced at once, they are liable to be constricted by the sphincter ani muscle, and become inflamed. At each stool more or less blood is lost, especially if they be constricted. Generally the patient gets into the habit of replacing the tumours after each evacuation, and during the intervals between stools they cause but little inconvenience. The loss of blood becoming habitual, even though the quantity be small at each time, the system is certain to give way, the patient becoming weak, thin, pale, sallow, dyspeptic, and disturbed with tinnitus aurium, giddiness, and palpitations. In extreme cases, prolapsus ani occurs, from the relaxed condition of the bowels; the inflammation may extend from the tumours to the intestine, producing rectitis, from which abscess and fistula may follow. It is evident that if such an affection be allowed to run its course uninterrupted, it must be both painful and dangerous; it ought, therefore, as soon as possible, to be arrested by treatment, which is either palliative or radical.

Treatment.—In slight cases, nitric acid has been used with advantage, when the tumours are small, recent, and consist of altered mucous membrane, investing veins slightly varicose, or probably only hypertrophied cellular tissue, the disease being seated mainly in the membrane itself. The tumours having been forced down by the patient, are rubbed over with strong nitric acid, so as to produce an eschar, and then returned within the sphincter muscle. The eschar after a short time separates, removing the altered membrane; and the cicatrix, when firm, may

by its contraction prevent recurrence of varix beneath. In patients with seriously deranged livers, and elderly full-living people, affected with disease of the heart, or having a tendency to affections of the head, bleeding piles are to be treated with care, and not too rashly interfered with; the system must first be placed in good condition, by dissipating the previous disorders.

The radical cure consists in removal of the tumour by knife or ligature. (See Operations.)

SPASM OF THE SPHINCTER ANI MUSCLE.—This may be known by violent pain in the anus, and difficulty of evacuating the fæces. The muscle is hard, and opposes the introduction of the finger. This affection may be caused by constipation of the bowels, or disorder of the general health. It occurs in paroxysms, which soon go off; but it may be permanent, and lead to organic thickening and stricture of the anus.

Treatment.—In recent cases, nothing more is required than the administration of calomel and Dover's powder, followed by castor oil. Enemata of warm water and laudanum will usually relieve the paroxysm. In more obstinate cases, however, a bougie must be passed daily; alteratives and enemata of warm water should be administered every twenty-four hours, or oftener, if necessary. If these means fail, then the sphincter ani muscle must be divided by the knife, and allowed to heal by granulations. The division of the sphincter, in this case, is performed in the same manner as in *fissure of the anus*.

SPASMODIC STRICTURE OF THE RECTUM may be recognised by great difficulty in evacuating the bowels, accompanied with spasmodic pain: it is an affection but little understood. According to Mr. Mayo, it depends upon a vitiated state of the secretions, and is more frequently relieved by a well-regulated diet and alterative medicines, aided by the use of injections, than by the employment of the bougie.

PERMANENT STRICTURE OF THE RECTUM is the sequence of chronic inflammation of the part. The stricture depends upon thickening and contraction of the mucous coat, partly on condensation and thickening of the entire coats of the bowel, but principally upon deposit in the submucous cellular tissue. The stricture

is generally situated two inches above the orifice of the rectum, sometimes four inches ; but rarely out of reach of the fore-finger.

Diagnosis.—There is great pain and difficulty in voiding the fæces, which is passed in narrow, flattened fragments, when solid ; when liquid, ejected with force, as if from a syringe. On examination per anum, the stricture, in most cases, may be felt by the finger. Irritation of the bladder and uterus, pains and cramps in the legs, with headache and dyspepsia, are occasional accompaniments of this disorder. Derangement of the digestive organs and impairment of the general health are induced ; the abdomen becomes swollen and tympanitic ; dilatation takes place above the stricture, and ulceration at this part of the mucous membrane is apt to occur, sometimes inducing fistula in ano. In patients far advanced in years, this disease may even assume a malignant form.

Prognosis in slight cases of stricture of the rectum, in patients of good constitution, is favourable ; but in those advanced in life, when the stricture is close, and much general disturbance of the system occurs, the prognosis is unfavourable.

Treatment in this disease consists in keeping the bowels open by aperient medicines and injections, so as to produce, daily, soft unirritating stools, and in mitigating the painful symptoms in the part by proper remedies. The main dependence in the cure of this disease is in the use of the bougie. This should be soft, and capable of being passed through the stricture with facility ; it should only be introduced once in three or four days, and allowed to remain fifteen or twenty minutes, or as long as the patient can bear it without pain. The bougie should be increased in size as the stricture yields. Probably the best bougie for this stricture is one made of gum-elastic, so short that when passed through the stricture, its lower extremity may be within the sphincter ani muscle ; a tape attached to the end will serve to extract it ; by this means it can be retained with more comfort by the patient. The greatest possible care should be used in passing instruments into the rectum. It should be remembered that the cure is effected by the gentle stimulus of pressure exciting absorption, and not by mere mechanical dilatation. When

a bougie of full size can be introduced, its introduction should be continued for some time to guard against contraction.

It sometimes happens that the stricture is tight and callous, resisting ordinary treatment. In these cases it is necessary to introduce a probe-pointed bistoury into the rectum, upon the forefinger, and make slight incisions or notches at several points in the circumference of the stricture; then dilate by the bougie as in the former instance.

MALIGNANT STRICTURE, OR SCHIRRO-CONTRACTED RECTUM, is not at all uncommon in aged persons, particularly in females, generally following a simple pre-existing disease, as piles, or simple stricture.

Diagnosis.—In addition to the symptoms of simple stricture of the rectum, there is copious bloody, fetid, puriform discharges, with greater sympathy of the urinary organs, more pain and difficulty in defecation, and with the ordinary constitutional cachexy which characterizes malignant disease.

Prognosis in this form of stricture is exceedingly unfavourable.

Treatment.—When the disease is confined to the verge of the anus, the diseased parts may be removed by the knife with great hopes of success. But should the disease extend some distance up the bowel, as it usually does, nothing more can be done than to palliate symptoms, assisting defecation by enemata and laxatives, and by lulling pain by opiates, employed locally and internally. Death usually takes place from exhaustion, but more frequently the patient perishes under symptoms of ileus, the malignant deposit having advanced so as to cause complete occlusion of the intestine.

Medullary Tumour forms sometimes between the bladder and the rectum, giving rise to great pain and uneasiness, interfering with the functions of the rectum and bladder.

Treatment in these cases can only be palliative.

TUMOURS WITHIN THE RECTUM.—Sarcomatous and other tumours occasionally arise from the rectum, creating irritation and diarrhœa. These tumours originate sometimes between the coats of the intestine. Prof. John Bell mentions large tumours of the rectum, soft, lumbricous, and of a shining red colour, involving the

whole circumference of the anus, and retiring deeply within the cavity of the bowel.

Treatment.—If the tumour be attached by a narrow pedicle and move freely, it may be brought away by forceps; but when it is attached by a broad base, then the ligature will be the better means of removing it. Dr. Gibson's mode of proceeding is probably the best that can be adopted; it consists in directing the patient to force the tumour out whilst sitting over hot water; then to pass a needle armed with a double ligature through its base, and tie one on each side; thus strangulated, the tumour soon sloughs away.

ENCYSTED RECTUM.—This is a troublesome affection, consisting in enlargement of the small pouches existing in the mucous membrane of the lower part of the rectum.

Diagnosis.—A patient troubled with sacculated rectum, will complain, for weeks or months, of uneasy sensations, or of excessive itching about the anus, as if from ascarides; generally there is but little pain attending it, but sometimes it is severe; usually there is more or less smarting after stool. This affection has been mistaken for neuralgia of the rectum.

Treatment.—We are indebted to Dr. Physick for proper ideas of this affection, as well as the right means of cure; he employed a probe, bent upon itself half an inch from the end; this, passed into the rectum and worked up and down, after a time hooks in an enlarged pouch, which is to be drawn down to the verge of the anus, so that it can be seen, (notwithstanding the pain it gives the patient,) and the whole pouch removed by a pair of scissors; treating as many as can be found in the same way.

FOREIGN BODIES IN THE RECTUM sometimes require surgical art to remove them. These bodies are sometimes forced up the rectum, but generally consist of articles taken by the mouth and arrested by the sphincter ani muscle, as fish-bones, bones of poultry, kernels of fruit, or they may consist of substances formed within the alimentary canal, as intestinal concretions.

Treatment consists in removing these substances either with the finger or forceps. Sometimes it may be necessary to dilate the rectum, and, in extreme cases, it may even be necessary to divide the sphincter ani muscle. In the extraction of rough or sharp

bodies, that would injure the intestine, the speculum should be first lubricated, and passed carefully by the body, so as to protect the rectum as the foreign substance is removed.

IMPERFORATE ANUS, *atresia ani*, signifies congenital closure of the rectum, which occurs in three ways. The rectum is sometimes fully developed, having its orifice closed by integumentary membrane only, or obstructed by a membranous septum at some distance from the anus, whilst the latter is in all respects perfect. Or the bowel may be imperfect, ending in a *cul de sac* at some distance from the perineum, in which there is a depression where the anus ought to be. Lastly, the rectum may be almost or entirely deficient; the sigmoid flexure terminating, in this case, in a *cul de sac* at the upper part of the pelvis.

Treatment.—There is no difficulty in the first form of *atresia ani*: it is only necessary to make an incision through the occluding membrane. A piece of lint may be introduced into the opening; but this is hardly called for, as the discharge of meconium is sufficient to keep the passage free.

The second form is the most common, and is more troublesome than the former. Considerable thickness of parts intervenes between the operator and the *cul de sac*. At first the indications of the position of the rectum may be obscure, from the absence of the bulging fluctuation apparent in the first case. Under these circumstances time must be allowed for the accumulation of meconium, to cause the greatest possible descent and distension of the extremity of the intestine. Pressure should then be made upon the abdomen or left hypogastric region, whilst an incision is made in the direction of the curve of the sacrum. Or, by means of a scalpel, an incision may be made through the integument, and, by cautious dissection in the natural curve of the sacrum, the *cul de sac* is sought for; avoiding the bladder, but at the same time not keeping too close upon the sacrum, lest the dissection be carried posterior to the intestine, which would be mistaken, in this case, for the bladder. The dissection must be kept along the centre of the sacrum, or the pelvic vessels may be wounded. Upon reaching the *cul de sac*, a free incision is to be made into it, and the wound kept open by a gum-elastic tube or tent of lint. Mr. Miller says:

“ After deep dissection we may fail to meet the bowel. Then it is quite warrantable to pass a trocar and canula upwards, cautiously, in the direction in which the bowel ought to be; and, on withdrawing the trocar, we may have the satisfaction of seeing meconium follow.”

If there be no sign about the perineum of the presence of the gut, after waiting several days, it is a pretty certain indication that the rectum is deficient. Still, the perineal incision and dissection should be made, to discover the *cul de sac*, if it exist: but, failing in this, an *artificial anus* must be established, or the child will perish. The operation of Amusat is probably the best for this purpose: it consists in making a transverse incision in the left lumbar region, just above the crista of the ilium; the dissection being carried down, comes upon the descending colon, which is fixed by a loop of thread, and then opened.

Sometimes the deficient rectum opens into the vagina or bladder, constituting a *cloaca*.

DISEASES AND INJURIES OF THE BLADDER AND URETHRA.

Injuries of the bladder are common occurrences in operations upon the pelvic viscera. In lithotomy it may be unnecessarily cut, or be bruised by forceps and scoop; in lithotripsy it may be pinched, bruised, or torn, by unskilful use of instruments; even in passing the catheter the bladder is sometimes injured: the danger, in these cases, arises from inflammation and hemorrhage. The bladder frequently suffers by accidents. In fracture of the pelvis, a spiculum of bone may penetrate it, particularly if it be distended, when fatal infiltration of urine may occur: it may be lacerated by a blow, bruise, kick, or fall, an accident that occurs in some cases when the force applied is not very great: but the force required to rupture the bladder is generally considerable. When rupture of the bladder occurs, it is almost universally distended with urine, the bladder giving way just where it rests upon the promontory of the sacrum.

Diagnosis.—There is great pain in the pelvic region; only a

small amount of urine passes by the urethra, and that more or less mixed with blood; the bladder is found collapsed by the finger, when passed into the vagina or rectum; the catheter draws off but little urine, and that is mixed with blood: very soon the signs of urinary infiltration manifest themselves.

In the parturient female the bladder, if distended, is apt to suffer, by the long-continued pressure of the head of an impacted fœtus; it may slough or ulcerate, and *vesico-vaginal* fistula result, if death do not follow. The bladder may be torn by the extraction of a fœtus by instruments.

Treatment.—The remedial means, in these accidents, consists in the immediate introduction of a catheter, which must be retained, to allay irritation and inflammation, and to support the system under the depressing effects of infiltration.

TUMOURS OF THE BLADDER, fortunately, are rare. The interior of the bladder, however, is sometimes the seat of simple and malignant tumours. Simple mucous polypi are found, in some cases, in considerable numbers, which strongly simulate symptoms of stone.

Malignant medullary tumours also attach themselves to the coats of the bladder, generally near its neck, apparently connected to the prostate gland, and occupy the cavity to a greater or less extent.

Diagnosis.—Micturition is frequent and painful, which is increased immediately after the effort; urine bloody, fetid, and often contains flaky masses of the tumour; these portions of the tumour sometimes block up the urethra, causing retention of urine; there is a dull weight in the loins, and the pain of urinating is more severe there than in a case of stone. The sound and feel of these tumours, communicated through the medium of a sound in the bladder, is so different from stone, that there is little reason for confounding the two diseases.

Cancerous tumours may extend from the rectum so as to involve the bladder in one diseased mass with itself.

Treatment.—Unfortunately, nothing can be done to remove these affections: all that art can do is to palliate symptoms by opiates and rest. When the urine cannot pass by the urethra,

even with the aid of a catheter, it becomes a matter of necessity to puncture the bladder above the pubes, and give it vent.

INFLAMMATION OF THE BLADDER may be acute or chronic; either of which constitutes a serious disorder.

Acute Cystitis may arise from direct injury, as lithotomy or lithotripsy; it may be a continuation or metastasis of inflammatory action elsewhere, as in gonorrhœa, or it may be of idiopathic origin. It sometimes follows the use of internal irritants, as cantharides, but generally it is the consequence of virulent and ill-treated gonorrhœa.

Diagnosis.—There is pain in the region of the bladder, perineum, sacrum, and sometimes a stinging pain along the urethra; tenderness over the pubes; urine voided frequently, with pain and straining, the pain increasing with an empty bladder; urine at first clouded with mucus, afterwards puriform. It sometimes happens that, after the urine has been voided, a small quantity of matter is expressed with great suffering; the urine is sometimes mixed with blood; occasionally, after turbid urine has passed, pure blood escapes in drops. The general system is affected with sympathetic fever. Inflammation may extend from the external coat of the bladder to the peritoneum, and give rise to peritonitis.

Treatment.—The antiphlogistic system is to be actively employed in this disease. General and topical depletion, fomentations, hip-bath, antimony, calomel, opium by the mouth and rectum is indispensable, after bleeding, to allay pain. The recumbent posture must be constantly kept: without this little can be done. The bowels must be gently moved by laxatives and enemata. During convalescence, the state of the urine will require special attention, the treatment being governed according to its acid or alkaline character.

Chronic Cystitis, Catarrhus Vesicæ, is generally symptomatic of some other affection, as gleet, stricture of the urethra, enlarged prostate, stone in the bladder, hemorrhoids, or other disease of the rectum, and renal irritation. It is sometimes idiopathic.

Diagnosis.—Bladder irritable; micturition frequent and painful; urine loaded with mucus; sometimes tinged with blood, occasionally yellowish and puriform, but oftener of a grayish colour, highly

alkaline, and excessively viscid, so as to adhere to the bottom of the vessel when turned upside down. In the early stages there is but little mucus, and the urine may remain acid; as the disease advances the quantity of mucus discharged is enormous, amounting sometimes to several pints in a day; the urine is of a brownish hue, and a most offensive ammoniacal odour. The mucus may clog the urethra, and cause retention of urine, which is difficult to manage, on account of the mucus closing the eyes of the catheter. In this stage of the disorder, there is frequent desire to micturate, and constant pain above the pubes. In general the mucus contains *phosphate of lime*, which can be seen in it in the form of white streaks; it is apt to collect and form a stone in the bladder. The mucous membrane may ulcerate, and be completely dissected from the muscular coat of the bladder. This state of things will be attended with intense pain in micturition; dark-coloured urine is passed, owing to admixture of a little blood, which exudes from the ulcerated surface, and sinks to the bottom of the vessel, like coffee-grounds. But more frequently the bladder throws off flakes of lymph, which become encrusted with patches of phosphate of lime. The bladder, by the constant exercise and straining, becomes hypertrophied and exceedingly thick; portions of its mucous membrane are apt to be forced between the intervals of its muscular fibres, forming pouches, which soon fill with mucus or phosphatic calculi. Finally the mucus becomes purulent, disease of the kidneys ensues, and the patient dies.

Dr. Prout remarks, that in the last stage of all kinds of bladder disease, the urine not unfrequently becomes suddenly acid, and the mucus and pus disappear immediately before death.

Treatment.—If there be stricture, enlarged prostate, or stone in the bladder, measures must be taken for their removal or relief. The recumbent posture, with the pelvis elevated, should be maintained. When the patient has considerable strength, with great aggravation of pain, a few ounces of blood may be taken from the sacrum or perineum, by cupping or leeching; but, as a general rule, it should be remembered, that lowering measures are injurious. Stimulating or opiate plasters to the sacrum are sometimes useful. Pain and irritation should be allayed by the hip-bath,

opiate enemata or suppository, or by the internal use of opium, which is of great service. Mild aperients should be administered to keep the bowels easy. The diet should consist of nutritious substances, easily digested, and not apt to turn sour, as boiled mutton, arrowroot, the potato, &c., with a moderate quantity of good wine or weak brandy and water. Mercury and the alkalies are inexpedient; yet, if the urine be still acid, and the state of the stomach and bowels require it, small doses may be given. Buchu and the mineral acids are useful, as in alkaline urine from other causes. If the buchu fail, trial should be made of the *pareira brava*, or *uva ursi*. The tincture of the muriate of iron is useful. A combination of benzoic acid and copaiba sometimes affords relief. Counter-irritation over the hypogastrium, or better, on the sacrum, is very serviceable. Opium may be given in full doses, and frequently repeated, to overcome pain and irritation; if this disagree with the system, then hyoscyamus may be substituted. Of the mineral acids, muriatic is generally preferred, in the dose of eight or ten drops, gradually increased. Half an ounce of the root of the *pareira brava* is boiled in three pints of water down to one; from eight to twelve ounces of this decoction is to be taken daily, or twenty or thirty grains of the extract may be daily administered. Of the strong infusions of buchu and *uva ursi*, ounce doses may be given three or four times a day. The tincture of the muriate of iron may be given, in doses of eight to fifteen drops, twice daily. An emulsion of a drachm of benzoic acid and half an ounce of copaiba, with camphor mixture, may be taken, in divided doses, in the course of forty-eight hours. In mild cases, these means will be found equal to the cure, but in the more severe forms of the disorder they may not. In these cases injection of the bladder must be resorted to, a measure never to be adopted except in aggravated conditions of the bladder, after the ordinary means of relief have failed, and when the disease has become thoroughly chronic. At first the injections should be detergent and soothing, as tepid water or a decoction of poppies; then a mixture of ten minims of dilute nitric acid, with two ounces of distilled water, may be thrown into the bladder and allowed to remain about thirty seconds. In the course of two days this injection may be

repeated, the acid being gradually increased; after a time this injection may be thrown in daily, but never oftener.

Washing out the bladder simply with warm water is useful. This may be readily effected by the double canula catheter of Mr. Fergusson; the water being thrown through one canula by a syringe, escapes by the other. In this way three or four pints of water may be passed through the bladder in a day; laudanum or a decoction of poppies may be added in some cases. By means of a gold double catheter, dilute nitric acid may also be injected, when the urine is highly ammoniacal.

In very obstinate cases, recourse may be had to M. Lallemand's mode of using nitrate of silver. The bladder having been emptied, the porte-caustique is passed; the stilet being pushed forward, a momentary contact of the nitrate of silver with the lining membrane is permitted; the instrument is withdrawn, whilst the caustic, dissolved in mucus, pervades the viscus. This application should be made with care, and the after consequences watched, lest over-action follow.

IRRITABLE BLADDER.—Chronic inflammation of the bladder is too often described as irritable bladder, or mistaken for it. Simple irritability may be the effect of mere nervousness, which is not uncommon in elderly persons; it may be sympathetic of disease of the kidney, or of irritation in the rectum. In the healthy state, the stimulus of the urine acts on the bladder only according to quantity; the bladder being filled, contracts, and thereby seeks relief. If, however, the urine be abnormally acid, or the mucous membrane of the bladder be morbidly sensitive, or if both these conditions exist at one and the same time, the ordinary stimulus of the urine is found to be intolerable. Mr. Miller remarks of this disorder, that, "Pathologically, it differs from any form of cystitis, in depending on irritation, and not on the inflammatory process; there is not necessarily structural change in the coats of the bladder. Practically, it is known by the absence of grave constitutional disorder, as well as by the absence of profuse secretion of vitiated mucus, the prominent characteristics of catarrhus vesicæ."

Diagnosis.—Frequent micturition, with uneasiness rather than actual pain, and almost constant desire to pass water. The general system and pulse are scarcely affected. The urine may be

limpid and clear; frequently it is clouded by mucus, and often deposits urates. The bladder is contracted, without structural change. In some cases, its coats have been found thinner than in health. The source of irritation may be in the mucous coat; more frequently it is found elsewhere: it may depend upon affection of the kidney; ascarides, hemorrhoids, or other diseases of the rectum; calculus, or other irritation in the urethra: in children it frequently depends upon a contracted state of the preputial orifice.

Treatment.—The principal points in the treatment lie in removing the cause; improving the intestinal canal and general health, and in restoring the anus and urethra to a sound condition. Anodyne injections, opium by the mouth, and small quantities of the alkalies largely diluted are exceedingly serviceable. The recumbent position should be recommended; local depletion and counter irritation should be employed. It ought to be remembered that mental anxiety induces a condition of system that simulates this disorder, which may be readily removed by quieting the nervous system by sedatives: hyoscyamus has been found useful for this purpose.

HEMATURIA signifies a spontaneous discharge of blood by the urethra. It proceeds from various causes. Stone in the kidney often creates a discharge of blood from its mucous membrane, particularly after violent exercise, or errors in diet; blows on the loins, sometimes, cause large discharges of blood by this canal. If the kidney be the source of blood, it may be known by the blood being equably diffused through the urine; by the presence of colourless coagula like small worms, and by the bloody urine being preceded and accompanied by pain in the loins, particularly if one side only be affected.

Hemorrhage from the bladder is the more frequent variety; it may proceed from cystitis; vesicular calculus; from ulceration of the mucous coat; enlarged and ulcerated prostate gland, particularly when this state is complicated with calculus, when the loss of blood is likely to be large and frequent; injuries inflicted upon the coats of the viscus by the use of instruments; even worms have been known, when lodged in the bladder, to cause fatal hemorrhage.

Hemorrhage from the mucous coat of the bladder, may be known by the blood flowing nearly pure from the urethra; it is generally passed after the urine has been voided almost untinged, so that blood unmixed with urine, is the last to be discharged from the bladder. In this case there is entire absence of pain in the loins, and renal symptoms.

Treatment.—Here again removal of the cause is the most important step, as it often is in the treatment of disease. If the hemorrhage proceed from the kidneys, they being in a state of inflammation, local antiphlogistic measures must be employed: the internal employment of acetate of lead will be found useful. If symptoms of debility attend, diluted acids, alum, and powdered galls, may be administered; when gout attends, alkalies and colchicum should be employed: but rest and the local application of cold ought not to be overlooked. In hemorrhage from the bladder, it is well to pass and retain a catheter in the organ, to prevent the accumulation and coagulation of blood in this viscus, and thereby avoid straining efforts at micturition. If the hemorrhage be profuse or continuous, then the bladder may be injected with astringents, as alum, one scruple to the pint of cold water: in order to break up coagula in the bladder, it will be necessary to inject it repeatedly with cold water.

Hemorrhage from the urethra may be recognised by the blood passing pure; the absence of renal and vesical symptoms; whilst the cause of the hemorrhage is usually evident,—as injury of the part, chordee, inflammatory action, or excessive venereal excitement.

Treatment.—This may generally be arrested by the application of cold, in the recumbent posture: if this do not suffice, then, by pressure upon the orifice of the urethra and the perineum, the confined blood may be converted into its own hæmostatic.

Suppression, retention, and incontinence of urine usually appear as symptoms of other affections.

IN SUPPRESSION OF URINE, (*ischuria renalis*,) the functions of the kidneys are more or less suspended. It may either be partial or entire: its causes may be *inflammatory*, *spasmodic*, or *mechanical*, and the symptoms will vary accordingly.

Diagnosis.—When it depends upon inflammation of the kidneys,

the symptoms will partake of this affection. But if the signs of inflammation be absent, and the patient subject to gout, or hysteria, the suppression may be supposed to depend in part, at least, on spasm. When the patient is subject to calculous affections, mechanical obstruction may be suspected; when this is the cause of suppression, it is always accompanied with more or less inflammation and spasm.

When the suppression is complete, at first there is anxiety, restlessness, and an indescribable sense of uneasiness and distension about the abdomen and loins. To these symptoms succeed a peculiar expression of torpidity and disinclination to bodily or mental exertion; the stomach is more or less affected, there is usually a tendency to nausea and hiccough; the body exhaling a urinous odour. The pulse is slower and more feeble than natural; the patient utters scarce a complaint, and gradually falls into a state of drowsiness, which increases until at last it terminates in complete coma; accompanied, sometimes, with repeated attacks of convulsions, and the patient expires.

Prognosis in all cases of suppression of urine, is unfavourable; for if the patient be not speedily relieved, death is inevitable.

Treatment.—It is evident that the cause must be sought for and removed if possible; whilst the mode of treatment pursued must depend upon the cause of the affection. When combined with inflammation of the kidney, the active antiphlogistic means recommended in that complaint, must be employed. When of a spasmodic character, antispasmodics, conjoined, in chronic or partial forms of the affection, with diuretics and tonics; if it be associated with gout, stimulating cataplasms may be applied to the feet; when calculus is the immediate cause of the difficulty, it becomes a matter of necessity to remove it at once; taking care to keep down inflammation as much as possible.

RETENTION OF URINE (*ischuria vesicalis*); here the kidneys perform their office as usual, the urine flows into the bladder; but from some cause, the secretion cannot be ejected from that viscus.

Diagnosis.—There is more or less pain and uneasiness in the region of the bladder: the distended bladder in most instances forms a swelling above the pubes, which is perceptible to the touch

and eye. There is inability to evacuate the urine, notwithstanding the promptings of an urgent desire; after a time the pain, straining and sickness become more intolerable; the pulse rises, the skin becomes hot, the tongue dry, the breath and perspiration have a urinous odour; absorption of the vesical contents has begun, and we have the same state of things as in the former case.

Prognosis.—In mild cases (where the causes are not serious) is favourable; but retention of urine, when complete and permitted to remain for a long time, almost always ends fatally, by acting on the kidneys, and producing suppression of urine, or terminating in rupture or gangrene of the bladder. Even when allowed to continue for a short length of time, it is very apt to terminate in partial paralysis of the bladder, or some other distressing affection of this organ, as well as of the kidneys, and general system.

Treatment.—Retention of urine arises from various causes, and the treatment must be as various as the causes that give rise to it. If the patient be first seen, when suffering under the torments of a bladder distended nearly to bursting, and the catheter be introduced, he passes as it were, from Purgatory to Elysium.

The principles already laid down for the treatment of the various affections giving rise to retention of urine, must be carried out, aided by the introduction of the catheter: if this be impracticable from an impervious stricture, the imperative necessity of evacuating the bladder, in order to save life, must not be lost sight of; the bladder must be relieved.

The urethra may, in some cases, be opened above the seat of stricture, where it is found distended by urine, and thus give relief: at other times it may be necessary to perforate the bladder from the perineum, or by passing a trocar through the rectum into the bladder, or by passing the trocar close above the symphysis pubis into the viscus.

INCONTINENCE OF URINE, (*enuresis*.)—This consists in an inability to retain urine in the bladder; it passes away involuntarily. Like suppression and retention, it depends upon a variety of causes. In early life, it is often associated with a tendency to urinary disease, and frequently with a disposition to gravel: it is often found in weak and irritable constitutions. In advanced life, it is frequently accompanied with disease of the neck of the bladder, or

prostate gland, either of an organic or paralytic character, or a loss of tone in the parts.

Incontinence of urine usually affects children at night, whilst during the day they can retain their urine very well: if the urine of these patients be examined, it will generally be found to contain acrid properties, and a predisposition to, or actual deposit of gravel: it is, therefore, evidently cruel to inflict corporeal punishment upon these poor little sufferers, as is too often the case. In the adult, incontinence of urine sometimes follows rheumatic or other fevers, injury of the spine, or degeneration of the spinal cord.

Prognosis is generally favourable in this affection; still in the inveterate forms of urinary incontinence, accompanied by diuresis, occurring in strumous subjects, it often resists all means of cure.

Treatment.—This must vary according to the means necessary to remove the cause. In children, where it is associated with gravel, this tendency must be corrected; for it is in vain to expect relief from remedies, whilst the cause remains. For this purpose great attention should be paid to diet; sours and sweets should be avoided, and the softest water only drank. The patient must not be allowed to lie upon his back; he should also be roused, and made to empty the bladder before the usual time for passing his urine has arrived, and thus break up the influence of habit. These means having produced a change, then the use of tonics, and cold or sea-bathing may be of service. Strychnia is sometimes useful, probably by allaying irritation and increasing the tone of the neck of the bladder. Cantharides internally, nitrate of potassa, and a blister over the sacrum, have all proved useful.

In the adult, pretty much the same treatment is necessary; as the use of strychnia, cantharides, tincture of the muriate of iron, and blisters over the sacrum.

PARALYSIS OF THE BLADDER may arise from injury or disease of the head or spine; typhus fever; any severe injury; distension of the bladder by urine from prostatic diseases, or stricture of the urethra.

Diagnosis.—Retention, or rather inability to expel the urine from the bladder; it dribbles away from the patient, without his having the power to prevent it. Retention from palsy, and reten-

tion from stricture are entirely different : retention from palsy may be known from the other by coming on suddenly, and there not being the least obstruction to the introduction of the catheter.

Treatment.—This is the same as for retention. It consists in the administration of strychnia, cantharides, tincture of the muriate of iron, &c.

ACUTE INFLAMMATION OF THE KIDNEY (*nephritis*). This is sometimes caused by blows on the loins, or by the irritation of renal calculi ; it is rarely an idiopathic primary affection.

Diagnosis.—Burning pain and tenderness in the loins ; colicky pains in the abdomen ; urine scanty and high-coloured ; bladder irritable, with constant desire to micturate ; fever, great thirst, and violent vomiting.

Treatment.—Antiphlogistic means must be employed ; as bleeding, cupping, leeching, castor oil, repeated doses of calomel, opium and antimony, with colchicum in gouty habits ; warm bath, or warm fomentations to the loins, and demulcent drinks.

CHRONIC DISEASE OF THE KIDNEYS, when it comes under the surgeon's care, is generally in consequence of long-standing disease of the urethra or bladder. When the bladder has been subject to frequent distension through stricture or enlarged prostate, its mucous membrane being inflamed, the ureters are liable to become distended and converted into subsidiary receptacles for urine ; violent straining to evacuate the bladder is the consequence : this with other causes, creates disease of the kidneys.

Diagnosis.—Patients with chronic disease of the kidneys, complain of general weakness and languor, bodily and mentally. Sleep is unrefreshing, and appetite impaired ; frequent pain or an aching sensation in one or both loins, shooting down occasionally to the testicles and groins ; the urine is usually *albuminous*, generally pale-coloured and opaquish, sometimes tinged with blood, and having at times shreds, or flakes of lymph through it, probably moulded into the shape of the ureters. As the disease advances, the urine becomes yellowish and purulent, and deposits pus upon standing. These cases usually end fatally : sometimes the patient dies of exhaustion and obstinate vomiting ; at others from the suppression of urine and coma, or acute inflammation.

Prognosis.—Unfavourable when the disease has made much headway.

Pathology.—The kidneys are soft and disorganized, and readily separated from their capsules, which adhere firmly to the fat and cellular tissue of the loins, and most likely are dilated into cysts, the secreting tissue being spread out over the dilated pelvis and infundibulum.

STRUMOUS DISEASE OF THE KIDNEY.—This is a form of disease of the kidney, which is apt to remain a long time unsuspected, for the reason, that it manifests itself mainly by irritability of the bladder.

Diagnosis.—The patient has a pale unhealthy, scrofulous appearance; urgent desire to micturate, which act is followed by considerable burning pain at the neck of the bladder and in the perineum. In these cases Dr. Prout says “the urine is generally acid, of a pale-greenish, whey-like colour, opalescent from the presence of minute flocculi, or diseased particles of epithelium or mucus; of low specific gravity (that is below 1.020); often albuminous, but rarely bloody.” The patient complains of weakness and loss of flesh; occasional pain and swelling of testicles, irritation of, or a gleet discharge from the prepuce or the orifice of the urethra, with occasional pain in the back; still the principal symptoms are referred to the bladder, and the surgeon might suspect the existence of stone. But if in such cases the urine be found *albuminous*, being free from the *ropy mucus* of chronic cystitis, the seat of disease is in the kidneys.

PYELITIS.—According to M. Rayer, this is an inflammation of the mucous lining of the pelvis and infundibula of the kidneys. It often accompanies renal calculus, catarrhus vesicæ, or badly managed gonorrhœa.

Diagnosis.—There is low fever, heat and pain in the back, irritation of the stomach and testicles, while flakes of epithelium and of mucus are observed in the urine.

ABSCESS OF THE KIDNEY.—If there be dull pain in the loins, with repeated rigors following nephritis, abscess may be suspected. The abscess may burst into the ureter, and immense quantities of pus flow off with the urine, or it may point outwardly, and dis-

charge at the loins, and patients may recover, although it is an extremely dangerous affection.

Treatment.—In the treatment of chronic affections of the kidney, diet is a matter of the greatest importance; all acid and indigestible substances must be carefully avoided, as well as acid wines and hard water. Blisters, issues, mercurial plasters, and extraet of belladonna, applied to the loins, are exceedingly useful. The surface of the body should be kept warm; for which purpose flannel must be worn. Infusions of buchu, or uva ursi, are sometimes beneficial. If there be calculus in the kidney, attention should be paid to the urine, so as to remove the condition which favours its formation.

DISEASES OF THE PROSTATE GLAND AND URETHRA.

ACUTE INFLAMMATION OF THE PROSTATE GLAND, *prostatitis*, may arise from virulent gonorrhœa, blows on the perineum, the rough passage of instruments by the urethra, excessive venereal indulgence, imprudent exposure to wet and cold, sympathetic influence of affections of the rectum, and by the internal use of irritants, as cantharides.

Diagnosis.—There is heat and pain in the perineum, and near the anus, with tenderness on pressure; the urine is discharged freely, but with pain, which is more acute as the few last drops are passed; great weight, pain, and throbbing at the neck of the bladder; on examination by the rectum, the swollen gland may be felt; not unfrequently the inflammatory action extends to the bladder, when the ordinary symptoms of cystitis are added to those of prostatitis.

Treatment.—Rigid confinement to the recumbent posture; cupping or leeching the perineum; hip-bath; fomentations, and opiate enemata. General bleeding may be called for by the activity of the inflammatory symptoms. If the urine cannot be passed without it, a small catheter may be employed; but this should be avoided, if possible.

ABSCESS OF THE PROSTATE GLAND.—When the foregoing symp-

toms undergo sudden aggravation, with rigor, increase of swelling, and tenderness on examination by the rectum, increased difficulty in micturition, particularly if there be fluctuation in the perineum, it may be presumed that matter is forming, or has already formed, in the gland.

Treatment.—It is all-important to open the abscess early, which should be done by a bistoury. If this be delayed, the abscess may open into the urethra, forming urinous abscess, or, passing into the rectum, form a recto-vesical fistula; or, it may open in the perineum, doing much injury to the intervening tissue. If the abscess burst into the urethra, it will be indicated by a discharge of pus with the urine; in this case the catheter must be used every time the patient wishes to micturate, to prevent the urine entering into and irritating the cyst.

ENLARGEMENT OF THE PROSTATE GLAND.—*Simple enlargement* of the prostate gland may be the result of chronic inflammation, or of hypertrophy, independently of inflammatory action. The first is not uncommon in middle age; the last is peculiar to advanced age, and, according to Sir B. Brodie, commences about the time the hair begins to turn gray. The gland may increase from one to fourteen times its normal bulk, becoming scirrhus. The enlargement may be uniform, or the central portion may enlarge with much greater rapidity than any other part, and project backwards into the bladder, but is liable to move forwards and act like a valve, thus preventing the flow of urine. In general, the lateral lobes enlarge unequally, by which a twist is given to the prostatic portion of the urethra.

Diagnosis.—When enlargement depends upon acute inflammation, its cause is evident: also from stricture, gleet, affections of the rectum, injury of the perineum, or habitual exercise. It may readily be recognised by the tumefaction felt about the neck of the bladder, and difficulty in urinating.

Chronic enlargement may be known by the age of the subject, slowness and difficulty of making water, sense of weight in the perineum, and tenesmus; frequent calls to pass urine, particularly at night; the patient cannot empty the bladder completely, and the portion that remains decomposes and becomes ammoniacal. Some-

times complete retention ensues, which may have been brought on by venereal excitement or exposure to cold. Finally, the gland continuing to enlarge, the bladder is constantly distended, the urine perpetually dribbles away, the ureters are converted into subsidiary receptacles, the kidneys become disorganized, the patient's little remaining strength is exhausted, and death closes the scene.

Prognosis.—In the first variety the prognosis is favourable; in the last, the contrary.

Treatment.—In that variety which arises from acute inflammatory action (which is sudden and temporary, comparatively speaking), the treatment consists in removing the cause; maintaining the recumbent posture; leeches or cups to the perineum, followed by counter-irritants; the internal use of the iodide of potassium, and the use of laxatives and enemata, will suffice for the cure. In obstinate cases an alterative course of mercury is expedient; amendment is often rapid during its administration.

In chronic enlargement medicines are useless, except in their application to the diseases of the bladder and kidneys, which often complicate this disorder. The only thing that can be done where there is no complication, is to draw off the urine two or three times a day, so that the bladder may be completely emptied. This is not always an easy operation; for, as already mentioned, the prostatic portion of the urethra is twisted, the enlarged third lobe encroaches upon the urethra, and renders it necessary to pass the beak of the catheter well up, so as to be close to the pubes. It is necessary to pass the catheter farther into the bladder than in the normal condition of the parts, on account of the lengthening of the prostatic portion of the urethra by the enlargement of the gland.

If complete retention of urine occur, opiates and enemata, with leeching or cupping, and warm hip-bath must be employed, and a catheter passed if possible. Gum catheters probably are better for these cases, for they should be retained in the bladder for two or three days; but if the catheter cannot be passed by the natural route, it must be thrust through the obstructing portion of the gland by means of a stilet fitted to a catheter, or the bladder may be punctured above the pubes, and a gum catheter kept constantly in

it through the wound, until the natural passage is restored, the patient being kept upon his back in the meantime.

MALIGNANT DISEASE OF THE PROSTATE GLAND is mostly of a medullary formation, which enlarges rapidly, ulcerates, and bleeds, passing through the various stages of such tumours. This disease is not peculiar to the aged, but may occur in children.

Diagnosis.—The symptoms are similar to those of ordinary enlargement, with the addition of those belonging to tumours in the bladder, as well as those which attend all malignant growths.

Prognosis.—This disease is incurable, and must prove fatal.

Treatment.—The treatment can only be palliative, as opiates, enemata, rest, and the use of the catheter, is all that art can do.

STRICTURE OF THE URETHRA.

Stricture of the urethra is of two kinds, viz: *spasmodic* and *permanent*.

SPASMODIC STRICTURE is supposed to depend upon the muscular fibres which surround the membranous portion of the urethra, at which point most surgeons think this stricture situated. It may, and generally does, affect subjects who have permanent stricture, or those having an irritable urethra from frequent attacks of gonorrhœa, or an altered condition of the urine, more especially a tendency to phosphatic deposits; all these conditions predispose to this disorder.

The *exciting causes* are exposure to cold and moisture, and indulgence in wine and acid drinks; therefore, these attacks often come on a short time after dinner. It may be caused by irritants taken internally or applied externally, as cantharides. One of the most frequent exciting causes is *inflammation*, so much so that some surgeons have described it as a distinct variety of stricture. It is generally excited by the abuse of injections, or by exposure and intemperance during acute gonorrhœa.

Diagnosis.—In spasmodic stricture, the patient finds himself suddenly unable to pass his water, the bladder becomes distended and can be felt, in the form of a tense tumour, above the pubes;

straining efforts become more frequent, the countenance is anxious, pulse quick, and skin hot.

Treatment.—The first step is to relieve the bladder of its urine. This is imperative, and can generally be easily effected with a catheter, particularly if the patient be placed for some time in a warm hip-bath. When the beak of the catheter impinges against the obstruction, it should be pressed firmly, but not forcibly; this firm pressure must be patiently continued; after a time the stricture yields, and the catheter slips into the bladder. If the stricture be very obstinate, bleeding, cupping, or leeching the perineum, may be required, also the use of opiate enemata, and immersion of the whole body in a bath, at about 104° F., until faintness supervenes. Nauseating doses of antimony or tobacco internally, and extract of belladonna to the perineum, are also useful.

Sulphate of quinia, it is said, has cured spasmodic stricture occurring periodically.

One of the best modes of managing this troublesome affection, is by the internal use of sulphate of magnesia and antimony, sufficient to keep up a slight action upon the skin and bowels, and the application of the extract of aconite to the perineum and along the urethra. The catheter should never be used, unless to relieve the bladder.

PERMANENT OR TRUE STRICTURE is an organic change in the urethra, causing a narrowing of the canal, which may be independent of spasm and of existing inflammatory action. Permanent stricture results from the inflammatory process in and near the urethra. Gonorrhœa is probably the most frequent cause of stricture. The inflammatory process or abnormal excitement is usually of some duration, and favours plastic exudation. Treatment by injection may be so miscondacted as to maintain or aggravate such action. Stricture may follow chronic inflammation of a minor grade, or abnormal excitement, which may arise from excess in venereal indulgence, or an acrid state of the urine. Injuries of the perineum create stricture, by developing inflammatory action in and around the part, causing a deposit of fibrin, which is not always removed by absorption. Slight contusions of the perineum may cause stricture in those who are much in the saddle. It is

asserted by some surgeons, that it is created sometimes by the unskilful use of bougies, lithontriptors, and other instruments. Healing of an ulceration in the urethra, by the contraction of the cicatrix, makes a very difficult and troublesome stricture, particularly when situated at the orifice.

The proximate cause of stricture is deposit of fibrin, and consequent structural change in the substance of the lining membrane of the urethra, and submucous cellular tissue. It is in the latter tissue that the deposit usually takes place.

The site of stricture is either the membranous portion of the urethra, three or four inches from the external orifice, the neck of the glans penis, or the external orifice of the urethra. The two former are the most frequent, but in bad cases there are usually several contractions. If the affection be the result of external injury, the point of this injury will be the seat of the stricture. The extent and degree of contraction is various. Sometimes there is a mere shred passing across the canal. This form, which is rare, is termed the *bridle stricture*. This stricture is sometimes tight, but limited to the smallest space, as if a thread were tied around the part. Generally the contraction is about a quarter of an inch in extent, varying from this to an inch; but several inches of the canal may be involved. The degree of narrowing of the canal varies also from the slightest encroachment upon its normal dimensions, to its complete occlusion.

The urethra, anterior to a stricture, becomes somewhat collapsed or contracted, whilst that portion of it between the strictured point and the bladder, becomes dilated. This dilatation may be to such extent that the pouch may hold more than an ounce of urine, and the mucous membrane at this place is prone to ulceration. Calculous matter may be retained there, or a stone occupy the whole space. From the strictured part, as well as from the surface of the mucous membrane generally, there is an abnormal discharge, usually clear, but sometimes puriform, capable of being increased by excitement, thus aggravating the congestion of the membrane. The lining membrane of the bladder becomes similarly affected, and its muscular coat hypertrophied. The enlarged muscular fibres of the bladder act strongly on the urine, which, being obstructed

in its passage through the urethra, reacts upon the mucous membrane, protruding it through the interspaces of the muscular fasciculi. Thus cysts are formed, and receive gradual additions to their parietes, which may in time rival the bladder in size.

In these cases of continued stricture, chronic cystitis may follow, and by morbid sympathy extend even to the kidneys, producing at first irritation, causing functional derangement, and, afterwards, organic disease. The pelvis of the kidney, and the ureters, are sometimes enormously dilated by puriform matter. These derangements of the kidney favour calculous formations in this organ. }

Diagnosis.—The signs of permanent stricture are often so indistinct as to escape the patient's notice for some time. The urine is passed in a diminished stream, sometimes twisted or scattered; micturition is frequent and tedious; often accompanied by pain and uneasiness in the bladder and penis, which cease when the bladder is evacuated. But after the patient thinks the bladder is empty, a few drops of urine (in some cases a considerable quantity) pass involuntarily: this after discharge comes from the dilatation behind the stricture. There is often a discharge of mucus from the urethra, which sometimes resembles gonorrhœa; this is increased by excess in diet or exercise. There is pain in the loins, thighs, and perineum; erection is often painful. In very tight strictures the urine passes guttatim, and the escape of semen is prevented. The testicles are liable to enlargement, and the rectum not unfrequently prolapses, inflames, fissures, or ulcerates; hemorrhoids may also appear: sometimes stricture of the urethra and rectum coexist. Straining in micturition is often so great, that the bowels are evacuated: even hernia may be induced from this cause. The prostate gland is liable to enlargement, abscess and ulceration. Retention of urine is liable to occur at any moment. In severe and protracted cases, the general health fails, the digestive organs are impaired, constitutional irritation sets in, disease of the kidneys becomes well marked, and the patient dies.

Treatment.—The object to be attained by treatment in this disease is to free the urethra from obstruction, either by division of the stricture or establishment of the action of absorption, upon the

contracting band : there is but one mode of effecting this last ; which is by pressure upon the part, through the medium of instruments passed into the urethra : for the mode of applying these principals, *see Operations*.

It should be remembered that a tendency to contraction remains, and to obviate this, the bougie, or catheter must be passed at intervals of two weeks, after the cure has been effected, gradually lengthening it until after the lapse of six months ; when, if the passage be found of full size, it may be discontinued. During the treatment by catheter, as little exercise as possible should be allowed ; venereal excitement and every kind of excess should be avoided.

Stricture of the urethra may give rise to urinary abscess, rupture of the urethra, fistula in perineo, and acute or chronic inflammation of the passage.

URINARY ABSCESS is a frequent consequence of stricture. This term is used to signify an abscess in the perineum, which occurs in consequence of an ulceration or laceration of the dilated portion of the urethra, and the escape of urine into the cellular tissue ; this excites inflammation, and an abscess is formed, filled with dark-coloured, putrid pus.

Diagnosis.—When a patient has an old stricture, there is greater difficulty than usual in passing water, he has rigor, the skin becomes hot, tongue furred and brown, pulse faltering, and, upon examination of the perineum, a deep, hard, and painful, but not very prominent swelling, may be discovered.

Treatment.—The knife must give immediate release to the pus. In these cases it is expedient to cut through the stricture, and introduce and continue a gum catheter in the bladder, until the fistulous opening closes : touch its orifice occasionally, if it require it, with nitrate of silver, or caustic potassa. By pursuing this treatment, the patient's life will often be preserved, when otherwise it might be lost.

RUPTURE OF THE URETHRA, *and extravasation of urine*, occurs from a fit of spasmodic retention, more obstinate than usual. The patient frequently gets out of bed and strains with all his force to pass his water ; at length, during a violent effort, he feels that some-

thing has given way; the painful sense of distention is relieved, and he thinks himself better: he may be able to pass a little water by the urethra, from the relaxation of the stricture.

Diagnosis.—The patient's sudden relief, and his sensations of something having given way, are strong symptomatic signs of the state of things within. At the time this sensation occurred, the urine was forced by the whole power of the abdominal muscles into the cellular tissue of the scrotum, perineum, and groins; the patient complains of smarting or tingling about the anus and perineum; the putrid urine escaped from the bladder, soon causes inflammation and sloughing; the skin over the parts infiltrated becomes red, which gives place to black gangrenous spots; low typhoid symptoms come on; the tongue becomes black, the pulse begins to fail, clammy skin, delirium, hiccup, and death.

Prognosis.—This is always a serious accident, and if not speedily relieved by remedial means, is very apt to prove fatal. A black spot upon the glans penis, being indicative of infiltration of the corpus spongiosum, is a very fatal sign.

Treatment.—The evacuation of the bladder generally relaxes the stricture, so that a staff or catheter may be passed into the bladder, when the stricture should be divided; a catheter must then be kept in the bladder, as before directed in similar cases: the cellular tissue about the perineum must be freely opened by a bistoury, wherever there is tumefaction and other signs of infiltration by urine.

The urethra may be ruptured by kicks or blows in the perineum, or by fracture of the pelvis.

The symptoms and treatment are the same as described in the last case. Leeching, fomentations, rest, and antiphlogistic regimen are all important after injuries of the perineum, to prevent the accession of inflammation.

FISTULA IN PERINEO, OR URINARY FISTULA, expresses a condition of parts where there is a communication between an external opening in the perineum and the urethra, by means of an orifice in this passage.

Diagnosis.—The urine dribbles away constantly from the perineal opening, and injections passed into the urethra can be forced out at the perineum.

Treatment.—The first step to be taken is to ascertain if stricture exist: if so, to dilate it, and to restore a healthy tone to the urethra. The fistula should then be stimulated by strong injections of sulphate of copper or nitrate of silver, or by passing a heated wire into it. The external orifice of the fistula must be kept open by lint and the application of potassa, until it heals from the bottom. A gum catheter should be retained in the bladder, to divert the urine from the course of the fistula, and the patient, if possible, kept constantly placed upon his face.

Sometimes a fistulous communication forms between the urethra and rectum. This can be recognised by air passing from the rectum through the urethra, and urine passing by the anus.

The *Treatment* is the same as recommended in the foregoing case.

ACUTE AND CHRONIC INFLAMMATION OF THE URETHRA, from whatever causes arising, do not differ essentially, in their symptoms or treatment, from gonorrhœa; except that topical bleeding, by cups and leeches, and the antiphlogistic system, should be more actively employed.

FOREIGN BODIES IN THE URETHRA may consist of calculi, or of substances introduced through the external orifice.

Treatment.—This consists in removing the extraneous substances, and combating inflammation.

To remove the extraneous substance the patient must be directed to strain during micturition, at the same time that aid is rendered by the fingers to shove the foreign body to the orifice of the urethra, which should then be seized by forceps, and removed. A good mode is to fix the foreign body by the fingers, then dilate the urethra by injections of cold water, and thus wash it away. But, if neither of these modes of procedure succeed, then the foreign substance must be pushed back to the membranous portion of the urethra, from which position it must be extracted by an incision into this portion of the urethra. Incisions into the urethra before the scrotum are apt to leave obstinate, if not irremediable fistulæ; they should, therefore, be avoided.

Solid Tumours sometimes form in the urethra, composed of indurated follicles. They must be treated according to the general

principles already laid down, or removed by pressure and the application of tincture of iodine.

HEMORRHAGE FROM THE URETHRA may arise from external injuries; the separation of a slough, formed by the application of caustics, or other causes; the rude introduction of bougies and other instruments into this passage, and by the rupture of blood-vessels in chordee.

Treatment.—The application of cold will generally suffice to arrest the hemorrhage. Should this fail, pressure by means of a tape bandage, evenly and firmly applied like a roller, will command the hemorrhage.

FALSE PASSAGE is usually formed by the introduction of small instruments, with too much force, in a wrong direction. It may be produced, also, by the application of caustics to the urethra.

Treatment.—When the surgeon feels conscious that he has made a false passage, he should leave the parts untouched for at least a week, and then proceed with the dilatation of the stricture with more care.

URINARY DEPOSITS, GRAVEL, AND DIATHESSES WHICH GIVE RISE TO THEM.

Urine may deviate from the healthy standard in a variety of ways. It may be *aqueous*; water, being in excess, constituting diuresis. Water may be deficient and the salts be in excess, the urine being highly coloured and scanty. *Mucus*, being in excess, forms a cloud in cooling, which is dispersed by heat; but, if it be in great abundance in the urine, it will adhere to the recipient vessel in a ropy, gelatinous-looking mass, coagulable by acetic acid into a dense membranous substance. Or, it may be *albuminous*; coagulable by heat and by nitric acid.

Urine may be considered practically of two kinds; one of low specific gravity, being defective in urea, indicating granular affection of the kidneys, or some other organic disease: the other is of ordinary density, without alteration in the proportion of urea—a concomitant of febrile and chronic affections, perfectly curable.

The urine may be *acid*; that is, possessing more than the slightly acid character of healthy urine: this condition generally depends upon uric acid, or the urates.

It may be *alkaline*, turbid, and of ammoniacal odour; resembling, when voided, the putrescence of stagnant urine: this condition depends upon the presence of carbonate of ammonia, which is either produced by putrescence of the urine within the bladder, or directly secreted from the blood, replacing urea. With this salt there may be present the carbonates of soda and potassa. The urine may also contain oil, fat, sugar, and other abnormal substances.

But the depraved condition of the urine with which surgery has mainly to treat, is that wherein *deposits* take place, either before or subsequent to its expulsion from the bladder. In deposit within the bladder, the term *gravel* is employed to designate it, and *sediment* when deposited after the urine is without the bladder. This matter may lodge in some part of the urinary apparatus, and concrete into *stone*.

These deposits may be divided into three classes, viz.: *lithic*, *oxalic*, and *phosphatic* deposits.

The *Diatheſis*, or state of constitution in which lithic acid gravel is precipitated from the urine, is very frequently hereditary, and intimately connected with gout; of which disease the deposit of *lithate of soda* is characteristic. It is also connected with the sanguine variety of scrofula: it may be induced by inordinate indulgence in animal food, wines, and malt liquors. It is generally found in subjects under the age of puberty, or those between forty and sixty years of age.

Lithic or Oxalic Acid Deposit is presumed by Dr. Prout to be an animal substance, formed of the effete albuminous tissues of the body. It is insoluble when uncombined, but, combined with an alkali, it becomes soluble. In the urine it is combined with ammonia, forming the *superlithate of ammonia*, the acid being in excess. This salt is held in solution by healthy urine; but, when present in excessive quantity, it is deposited in the form of an impalpable powder, constituting the *amorphous lithic sediment*. If the urine be unnaturally acid, the lithic acid will be separated

from the ammonia, and be deposited in the crystalline form, which constitutes *lithic*, or *red gravel*.

Amorphous Lithic Sediments are of three kinds. The first variety is a *yellowish sediment*, found in the urine when the digestive organs are out of order: this consists almost entirely of lithate of ammonia (supposed by Dr. Prout to be formed of imperfect chyle), mixed with the colouring matter of the urine, and a little of the phosphates, the quantity of which is in proportion to the whiteness of the sediment. The urine thus composed, is always acid, and clear when passed; the sediment is deposited as it cools, and may be redissolved by the addition of hot water.

The second variety is termed *lateritious sediment*, from its resemblance to brick dust: this red powder is deposited in the progress of hectic; the decline of inflammatory fever, and especially in gout and rheumatism. It is composed of the *lithate of ammonia*, the *colouring matter* of the urine, and a little of the *purpurate of ammonia*.

The third variety is a *pink sediment*, which is very rare; it is deposited in organic disease and hectic. This sediment consists of the lithate and purpurate of ammonia, without the colouring matter of the urine.

Crystallized Lithic Deposits.—The most common of these is the *red gravel*; consisting of minute crystals of lithic acid, looking like cayenne pepper. When this is precipitated the urine is clear, high-coloured, small in quantity, and acid. Sometimes the lithic acid is secreted in a semifluid state, which soon concretes into stone in the kidney, accompanied with *nephritic symptoms*, constituting *a fit of the gravel*, as it passes hence to the bladder, which is manifested by feverishness, pain passing from the loins to the bladder, aching of the testicles and hips, and frequent micturition, attended with severe scalding.

Treatment.—This must vary according to the cause. In the fevers mentioned, the deposit ceases as the constitutional symptoms subside. In other cases, the treatment may be said to be twofold. By the administration of alkalis, with which uric acid combines, forming soluble salts; whilst at the same time (mainly, perhaps by the vehicle in which the alkali is given) the aqueous portion of

the urine is increased, and by attention to regimen, exercise, and the skin, we seek to rectify the depraved state of the digestive organs, on which the evil in the great majority of cases depends. Both modes of treatment are of service, but the latter is obviously the more important. It is necessary, usually, to combine them. The *diet* should be plain and temperate, consisting of meat once a day, with well-dressed vegetables; but moderation in quantity is all important. Fermented liquors should be taken sparingly; sherry wine is probably the best. Malt liquors, pastry, and sweet wines should be avoided. Ripe fruits are rather beneficial. The *action of the skin* must be promoted by exercise, hot bath, hot air, or of sulphur vapour, if there be difficulty of perspiration, or if the skin be diseased; for it should be remembered, that the skin eliminates a great deal of acid. The liver and bowels should be freely acted on by mercurials and purgatives, with the addition of colchicum if there be a gouty tendency. The superabundance of acid in the system must be counteracted by the use of magnesia, soda, or potassa. There is an objection to the use of soda, on account of it forming an insoluble salt with lithic acid; but many consider the phosphate of soda both safe and useful, and the carbonate quite efficient. Magnesia is seldom prescribed for any length of time, because it is apt to concrete into hardened masses in the intestines. Potassa is usually preferred; its salts being more soluble than those of soda. The *bicarbonate* is generally given in scruple or half drachm doses largely diluted, and may be pleasantly combined with a few grains of citric acid. The best time for its administration is probably about two hours after dinner, when alkalies are most wanted to neutralize the free acid of indigestion. The borate, citrate, and tartrate of potassa are all available in these cases.

However simple the use of alkaline remedies may seem, they should never be persevered in carelessly: their over use may convert the sthenic state of the system into the asthenic, inducing serious constitutional disorder, and causing an ammoniacal and phosphatic state of the urine. The test-paper must be used from time to time, and the state of the system carefully attended to.

Dr. Prout recommends that an action be kept up upon the kid-

neys ; for which purpose he advises the addition of five grains of nitre to each dose of alkali and soda water, and alkalies combined with vegetable acids. Soda and Seidlitz powders are useful, for the vegetable acid is digested in the stomach, and the alkali passes to the kidneys.

Oxalic Deposits.—Oxalic acid is supposed by Dr. Prout to be derived either from the imperfect assimilation of vegetable matter in the stomach, or from an abnormal change in the gelatinous tissues of the body. Hence, subjects possessing the *oxalic acid diathesis* have generally a dry, irritable skin—are liable to boils—in advanced age to carbuncles, and often suffer from dyspepsia, with flatulence and palpitations. But the train of constitutional symptoms belonging to this diathesis are of an irritable or nervous, rather than of a congestive or inflammatory character, as in the lithic acid diathesis. The urine is generally transparent, of a pale greenish-yellow or citron hue, of moderate specific gravity, and remarkably free from sediment : so that individuals with this diathesis cannot be said to suffer from *gravel*.

It is seldom that stone is formed in this diathesis. When this does occur, it appears to be owing to an accidental secretion of an unusual quantity of phosphate or carbonate of lime from the urinary organs ; which, combining with the oxalic acid, forms the *oxalate of lime*, or *mulberry calculus*.

The *Oxalic Diathesis*, according to Dr. Prout, is exceedingly common ; although, as it rarely leads to stone, and never produces gravel, it is apt to pass unnoticed amidst the dyspepsia, hypochondriasis, and skin disease, with which it is associated. It may be caused by residence in damp, malarious situations, and by a diet of unwholesome saccharine or farinaceous matters. It may also be induced or aggravated by partaking too freely of vegetables in which oxalic acid exists—as rhubarb-stalks and sorrel ; although these substances, in moderate quantities, are readily digested by the healthy stomach.

Treatment.—The patient must be kept in as good health as possible, by strict attention to diet and regimen. The diet should consist of plain animal food, with bread or other farinaceous substances ; avoiding sugar and all acescent substances, and hard

water. The skin should be kept in order by flannel clothing, exercise, and occasional baths. If there be acidity, with flatulence, small doses of alkalis with ammonia may be given after meals, and the stomach may, at the same time, be fortified by the use of bitters, and small doses of mineral acids, given an hour or two before meals.

Phosphatic Deposits—White Gravel.—The phosphate of magnesia is an ingredient of healthy urine, and is very soluble. Meeting with ammonia, engendered by the decomposition of urea, an insoluble salt is formed, the phosphate of ammonia and magnesia. In certain unhealthy conditions, phosphate of lime is secreted by the kidney, and copiously by the mucous membrane of the bladder.

There are three varieties of *white gravel*: the *triple phosphates*, or phosphate of ammonia and magnesia, or ammoniaco-magnesian phosphate; the *phosphate of lime*, and the *mixed or fusible phosphates*, consisting of the two first varieties combined.

The *Triple Phosphate* is formed as follows:—The phosphate of magnesia, which exists naturally in the urine, is a very soluble salt, with an excess of acid. It happens sometimes that it is secreted in preternaturally large quantity, and at the same time *urea*, a peculiar principle contained in the urine, which is exceedingly prone to decomposition, is converted into ammonia. The ammonia uniting with the phosphate of magnesia, forms an insoluble triple salt, the phosphate of ammonia and magnesia, which is precipitated in the form of minute, brilliant, white crystals: hence its name, *white gravel*. In these cases the urine is always pale, greater in quantity than natural, and of low specific gravity; but sometimes it is passed slightly opaque. It is feebly acid, scarcely reddening litmus paper. It has a slightly nauseous smell, which soon becomes ammoniacal and offensive, exhibiting the peculiar crystals of the triple phosphate, which often float on the surface, and look like an iridescent film of grease.

Phosphate of Lime is deposited from the urine in the form of an impalpable powder, which is generally white, but occasionally tinged with the colouring matter of the urine. The general characters of the urine are the same as those of the last variety. Strictly speaking, this salt is a secretion of the mucous membrane

of the bladder and kidney, when labouring under chronic inflammation, or otherwise degenerated. It is always secreted when the urinary organs are subjected to long-continued irritation, whether from a catheter, stone, diseased urine, or a foreign body.

Mixed or Fusible Phosphates.—The phosphate of lime is rarely deposited alone, but is generally associated with the triple phosphate; which may be accounted for thus:—If the triple phosphate exist first in the urine, by irritating the urinary receptacles, it gives rise to the secretion of phosphate of lime; or, if the phosphate of lime be first secreted by the urinary mucous membrane, there will speedily be induced an evolution of the triple phosphate from the kidneys.

The *Symptoms* which attend the continuance of phosphatic deposit are invariably of the asthenic type. The patient is pale, weak, nervous, irritable, incapable of sustaining exertion of body or mind; bowels flatulent and irregular, with constant oppressive pain in the loins. The urine is copious, pale, very offensive, and deposits a thick mortar-like sediment, mixed with more or less of the crystallized triple phosphate.

Causes.—The *phosphatic diathesis* offers a remarkable contrast to the lithic, in the qualities of the urine, the characters of the constitution, and the causes which engender it. Persons whose urine deposits the triple phosphate have a pale, bloodless appearance; complain of exhaustion and debility, and of an aching, weak pain in the loins. The causes may be local or constitutional. Whatever tends to exhaust the general or nervous system, tends to induce this deposit: over-exertion of mind or body; insufficient food; the habitual use of depressing medicines, as mercury, alkalies, or saline purgatives; injury of the kidney or spine; organic disease in the bladder, kidney, ureters, or prostate gland. An occasional deposit of phosphates may follow slight causes; as errors in diet, or profuse perspiration under violent exercise. But continuance of these deposits invariably denotes broken health. The least formidable cases are those in which the ammoniacomagnesian phosphates alone are found; the worst are usually those in which the deposit consists of a combination of this salt with the phosphate of lime.

Phosphatic gravel is not prone to agglomerate within the bladder, unless a nucleus be present; in this case the cohesion of particles around the nucleus takes place rapidly.

Treatment.—As in the case of *uric deposit*, the treatment must be directed both to the removal of the cause, and the prevention of the deposit. Diet must be generous, but plain, including sound malt liquor, port, or sherry wine. The mineral acids; as muriatic, nitric, or a combination of both, exert a double influence by increasing the solubility of the phosphates, and giving a tone to the *primæ viæ* and general system. They should be given in doses of a few drops, much diluted, and gradually increased. Acescent vegetables, fruits, sugar, pastry, hard beer or cider, and thin acid French wines, are highly injurious. Fresh air and good exercise are invaluable. Tonics, opium, bark, quinia, or steel, may be given in combination with the mineral acids. In confirmed cases, opium agrees remarkably well with the patient, by allaying pain and nervous irritation, without impairing the appetite or inducing costiveness. All diuretics as a general rule, are injurious: mercury and the alkalies are unadvisable, except when required by the state of the stomach, for sometimes the stomach abounds in acidity, where the health is much disordered. In such cases small doses of the alkalies may be given after meals; whilst tonics and acids may be given an hour or two before meals.

URINARY CALCULI.

Urinary calculi are formed by aggregation of particles of calculous matter around a nucleus. A foreign body introduced into the bladder, through the urethra, by a wound, or by ulceration, remaining in this viscus, soon becomes coated by calculous matter, even though no tendency to such deposit previously existed. Seeds, straws, portions of bougies or other instruments, lint, or other materials used in operations upon the bladder, or a portion of necrosed bone, may ulcerate through the coats of the bladder and thus become the nucleus of a stone. The most common nucleus is a particle of uric acid, or oxalate of lime, formed in the kidney, and conveyed to the bladder, or it may become coherent in the

kidney, and by aggregation form a stone in its original site; but this is rare. Even blood, escaped from the kidney or mucous membrane of the bladder, may furnish a mass of fibrin, sufficient to elicit this untoward formation; particularly if there be a tendency in the system to gravel.

There are twelve varieties of stone. Those of most common occurrence are, the *uric*, *mulberry*, *phosphatic* and *alternating* calculi. Stones vary in their nature, according to the diathesis which prevails during their formation.

A stone is said to be *renal*, when it forms and remains in the kidney: when originating in the bladder, or growing there after descent from the kidney, it is called *vesical*: originating, or arrested in the urethra, it is said to be *urethral*: when formed in the prostatic ducts, it is designated *prostatic*.

Stone is most common in temperate climates: the old are more frequently attacked than the young: the sedentary are more liable to it than the active; the luxurious than the temperate; males than females. Certain districts are remarkably prolific in stone. This disease is thought to be hereditary, like its kindred affection gout.

PROPERTIES OF CALCULI.

I. *The uric or lithic acid calculus*, consists chiefly of uric acid, but contains a greater or less proportion of urate of ammonia: this variety comprises probably two-thirds of all calculi. It has a fawn, brownish-red, or mahogany colour; flattened, smooth, or finely tuberculated by crystals of a concentric arrangement; in size it may vary from a pea to that of an orange: it is lamellated in structure, which is observable upon dividing it through the centre.

Tests.—Its solubility in caustic potassa: gradual consumption before the blowpipe: digested in nitric acid and evaporated, it leaves a scarlet residue, *purpuric acid*, which becomes a beautiful purple on the addition of ammonia, forming *muroxide*.

II. *Urate, or lithate of ammonia*.—This salt rarely forms a concretion by itself. It enters into combination with uric acid

calculi. When pure, the surface is similar to that of uric acid; but it is more frequently tuberculated than smooth; of clay colour; fracture fine and earthy; the layers are concentric. This comparatively rare calculus is peculiar to children.

Tests.—It may be recognised by the same means as the preceding; with this addition, that ammonia is evolved during its solution in potassa.

III. *The oxalate of lime, or mulberry calculus*, is not unlike a mulberry in size, form, and colour; being dark brown or red, rough and tuberculated; the texture is imperfectly lamellated; in size it seldom exceeds a walnut: it is always single, and its density and weight are comparatively great. It is by no means unfrequent; especially in young people, and is always of slow formation.

Tests.—It is soluble in nitric acid. Exposed to the blowpipe, the acid is burned off, and quicklime is left, which, being moistened, gives to turmeric paper a red colour.

The smooth *hempsced calculus* is of renal origin. If one remain in the bladder, it becomes variously coated, according to the diathesis that prevails. If the oxalic diathesis continue, the hempsced sooner or later passes into the mulberry formation.

IV. *Phosphate of Lime, or Bone Earth Calculus*, is rare. Calculi seldom consist of this salt alone. When they do, their surfaces are smooth like porcelain; they are spheroidal, usually of small size, pale brown, friable, and regularly lamellated.

Tests.—Soluble in nitric and muriatic acids; precipitated by liquor ammonia; infusible, except at an intense heat.

V. *The Ammoniaco-Magnesian Phosphate, or Triple Phosphate.*—This and the following seldom compose stones entirely, but are rather coatings or layers to others, more especially to the uric acid and oxalate of lime. The colour is pale-gray or nearly white; surface covered with minute shining crystals; the texture is not laminated, or at least is imperfectly so; it is soft, easily broken or pulverised, and may attain a large size.

Tests.—Solubility in acetic and muriatic acids. Ammonia is evolved by treating it with liquor potassæ. Diminution and imperfect fusion under the blowpipe, exhaling an ammoniacal odour.

VI. *The Fusible Calculus* is composed of the ammoniaco-mag-

nesian phosphate, conjoined with phosphate of lime. It is white and friable, like chalk or mortar, and may stain the finger when touched. Its size and form are various.

Test.—Its remarkable fusibility before the blowpipe.

VII. *Carbonate of Lime.*—This calculus is common in the lower animals, but rare in man. It is white, spherical, smooth, and friable.

Test.—It dissolves in muriatic acid, with effervescence.

VIII. *The Cystic Oxide Calculus* is rare also; of yellowish-white colour, surface of a smooth crystallized appearance, not laminated in structure, but presenting the appearance of a confusedly crystallized mass; the fracture exhibits a peculiar shining lustre; small fragments are semi-transparent.

Tests.—The blowpipe elicits a peculiar odour. It is readily soluble in the alkalies and dilute mineral acids.

IX. *The Xanthic Oxide Calculus* is more rare than the preceding. Its texture is compact, hard, and lamellated, surface smooth, shape ovoid, colour cinnamon-brown.

Tests.—Consumption under the flame of the blowpipe, leaving a white ash, and exhaling a peculiar fetid odour. Solubility in acids and alkalies, but more readily in the latter. The residue of solution in nitric acid, evaporated to dryness, is of a bright lemon-yellow-colour, whence the name.

X. *The Lithate of Soda* sometimes enters into the formation of calculi, but rarely constitutes a calculus of itself. The mass is white, friable, and soft, similar to what is seen in the tophous concretions of gout, in the neighbourhood of joints.

Tests.—Solubility in caustic potassa, with the aid of heat. Treating it with dilute sulphuric or muriatic acid, the soda is separated, whilst the uric acid remains, and may be obtained by filtration and washing.

XI. *The Fibrous Calculus*, like the xanthic oxide, occurs rarely. And, perhaps, the term calculus is scarcely applicable to almost one solitary case on record. Such formations, however, may not unfrequently constitute nuclei of the ordinary calculi.

XII. *The Alternating Calculus* is not of unfrequent occurrence. Few large calculi fail to present more or less of the alternating

character, the nuclei consisting of uric acid, or oxalate of lime, variously coated or alternated, the last covering being invariably phosphatic, and generally of the nature of fusible calculus. The mulberry or uric calculus having formed, creates much irritation in the urinary organs, and causes changes also in the general system for the worse. The urinary secretion becomes more and more depraved, and at last that derangement is produced which is favourable to the formation of the ammoniaco-magnesian phosphate. This is deposited on the growing stone, and, uniting with the phosphate of lime, now furnished by the diseased mucous membrane of the bladder, constitutes the fusible formation.

Diagnosis.—*Stone in the bladder* is not generally difficult to diagnosticate. There is irritability of the bladder; frequent and irresistible desire to make water; occasional sudden stoppage of the stream during micturition, by the stone falling upon the orifice of the urethra, the urine probably flowing again if the patient throw himself upon his hands and knees, or change his position; occasional pain in the neck of the bladder, increased after micturition; pain in the glans penis, and if the patient be young, he attempts to alleviate it by pulling at the prepuce, which becomes extremely elongated: but the only sign to be fully relied upon, is actual contact with the stone, by means of a sound passed into the bladder; by this medium both the senses of touch, and hearing may be convinced of the presence of stone.

The symptoms of stone vary in severity according to its size and roughness; the state of the urine, and the condition of the bladder, whether healthy or inflamed. These symptoms may be slight for years; indeed, a little pain and bloody urine on micturating after riding, may be the only inconveniences experienced. But after a certain time the bladder suffers just as it does from any other cause of irritation; the urine deposits a slight cloud of mucus; the bladder becomes more irritable, and finally inflames; the urine becomes alkaline, loaded with viscid mucus and with the triple phosphate and phosphate of lime; the strength fails, and, after years of suffering, the patient finally sinks under the irritation. Sir B. Brodie remarks, "that if the prostate become en-

larged, the sufferings from stone are mitigated; because it is prevented from falling on the neck of the bladder."

Treatment.—The treatment of calculous diseases plainly resolves itself into the following indications. To prevent the formation of stone, by correction of the calculous diathesis. To favour spontaneous expulsion of the stone, when formed. To alleviate suffering and delay progress of the disease. And to remove the stone by operation.

Sir B. Brodie has shown that *phosphatic* calculi may be dissolved altogether, or so disintegrated and reduced in size that they may escape through the urethra, by means of injections of dilute nitric acid passed through a double gold catheter in the manner directed for chronic cystitis.

There is no doubt that *lithic acid calculi* have been dissolved by means of mineral waters, holding large quantities of carbonic acid in solution: also, that they have been spontaneously disintegrated by the urine, when it has been restored to its healthy condition. But these means are too tedious and uncertain to be strongly recommended as principles in the management of this disease.

There are two operations practised at present for the removal of stone from the bladder: the first is *Lithotomy*, which consists in cutting into the bladder and removing the calculous mass at once: the second is *Lithotripsy*, which operation consists in crushing, or dividing the stone within the bladder, by means of an instrument passed through the urethra, by which the stone is broken, so that the fragments may be washed off during micturition.

STONE IN THE KIDNEY AND URETER.

Diagnosis.—Dull aching, with a sensation of pain in the loins, and a sharp pricking feeling in the region of the kidneys; pain in the serobiculus cordis, and occasional vomiting; the stomach is generally irritable; urine mixed with blood after violent exercise; frequent voiding of urine with pain and heat; testicles painful and retracted; numbness, pain, and cramp in the thigh of the affected side; occasional attacks of inflammation of the kidney;

purulent matter voided with the urine; hæmaturia, pain, general disorder, and serious exhaustion may ensue. Generally the irritation descends, and the bladder sympathizes by functional, or organic disorder. Calculi in the kidney are mostly of *lithic acid*, which may be known by a deposit from the urine of red sand.

A small, smooth calculus may glide along the ureter imperceptibly; but generally its descent is marked by symptoms more or less severe, commonly called a *fit of the gravel*. The patient is indisposed, and vomits occasionally; he is alarmed, and fears the result; has shivering or chills; the pain leaves the kidney and shoots downwards in the course of the ureter, and often down the corresponding thigh, with much intensity, and is sometimes insupportably severe; the testicle is retracted and painful, the seat of neuralgia, or irritation, even acute orchitis may result. General inflammatory fever may occur, in consequence of inflammation of the ureter, kidney, bladder, or testicles. If the stone be arrested in the ureter, all the symptoms are aggravated, and the risk of inflammation becomes more imminent.

Treatment.—The treatment of renal calculus consists in favouring the descent, palliating the urgency of the symptoms, and correcting the diathesis. To expedite its passage through the ureter, diluents, diuretics, and cautious exercise should be employed to dislodge it. In case of inflammation and pain, cupping or leeching on the loins; purgatives or mild aperients, copious enemata of warm water, opium, or henbane, and warm baths or fomentations. When much burning pain is complained of, pounded ice applied to the loins, gives great relief.

The ordinary and most favourable result of renal calculus is, when it descends through the ureter into the bladder.

DISEASES OF THE MALE GENITAL ORGANS.

WOUNDS OF THE PENIS may be either incised, lacerated, contused, gun-shot, or other varieties of wounds.

Treatment.—They must be treated upon the principles governing such wounds in other parts of the body. If hemorrhage can-

not be stopped without it, a bougie or catheter must be passed into the urethra, and a firm bandage applied, but should not be too long retained, or it may cause swelling and excite erection. In cases where the urethra is divided, it may be necessary to wear a catheter until the wound heals, to prevent effusion of urine.

ULCERS OF THE PENIS.—The loose skin covering the glans and body of the penis, is subject to phlegmonous inflammation and abscess, which is often mistaken for chancre.

THE ULCUS ERRATICUM is almost invariably met with in subjects of bad constitutions, as drunkards, and those who have suffered from the abuse of mercury.

Diagnosis.—It may follow sexual intercourse, and can generally be distinguished by the sore which occupies the body of the penis, ascending in a spiral form, which healing below, breaks new skin above, and may thus encircle the penis, and reach even to the groin and pubes. The edges of this ulcer are everted and indurated; the granulations foul, and the pain severe and burning.

PSORIASIS PREPUTIALIS is an affection almost peculiar to those individuals who have the prepuce unnaturally long, tender, and succulent.

Diagnosis.—It appears in deep fissures or cracks, which pervade the edges of the prepuce; these discharge at first a cohesive, afterwards, a purulent matter; they bleed freely upon being irritated, and are excessively tender, painful, and difficult to heal.

HERPES PREPUTIALIS, differs entirely from the previous affection.

Diagnosis.—It commences in the form of vesicles, which, upon breaking, leave, when situated on the inner surface of the prepuce, a small, round, yellowish-white ulcer, and when it occupies the outer skin of the prepuce, forms a scab. Each vesicle has its corresponding sore, which often unites with those adjoining it, until one extended surface of ulceration is established. According to Mr. Evans, this ulcer arises from derangement of the digestive organs, and is non-contagious.

Excoriation, or abrasion, of the glans penis or prepuce, may be the result of friction; of preternatural tenderness of parts; excessive secretion of the whitish, sebaceous matter, which seems pecu-

liar to some persons ; want of cleanliness, or from acrid secretions of the vagina. From any of these causes troublesome ulcers arise, which are often mistaken for syphilitic sores.

Diagnosis.—The external characters of this disease are sufficiently well marked, generally, to enable it to be distinguished from any other, if care be used in the examination. These ulcers are superficial, irregular, in separate patches, of a yellowish hue in the commencement, but surrounded in the advanced stages by a red areola: there is extraordinary itching, with undue serous or purulent secretions, followed in some instances by sympathetic enlargement of the inguinal glands.

Treatment.—Phlegmonous inflammation of the penis is rarely susceptible of resolution. The pus should be evacuated by means of a lancet, as soon as formed, an emollient poultice applied for a day or two, when Turner's cerate or mild lotions may be employed. If fungous granulations arise, they must be touched with the sulphate of copper, or nitrate of silver.

Ulcus erraticum, like the common irritable ulcer of other parts, must be treated with soothing and sedative lotions ; as the acetate of lead and sulphate of zinc, blended with gum arabic and opium. Sometimes, weak solutions of nitrate of silver, or nitric acid prove useful. Acrid and stimulating applications generally increase the irritability of the ulcer. General treatment in these cases is often more useful than local applications: blue pill, as an alterative, attention to diet, and active antiphlogistic measures, in plethoric subjects. Where this ulcer affects a patient broken down by intemperance, or other cause, the plan of treatment must be the opposite. Here the system must be supported by nourishment and tonics: the internal use of medicines, as well as the local applications must tend to the same point, to give force and vigour to the system.

For *psoriasis preputialis* the treatment must consist in various astringent applications: citrine ointment, reduced to one half its ordinary strength, is probably one of the best applications that can be made.

In *herpes preputialis* great attention should be paid to diet and cleanliness: the mildest local applications should be used, and the part allowed to scab over.

Simple excoriations should be treated with moderately astringent lotions, and the part kept perfectly quiet: if the sore become indolent in its character, a few touches of nitrate of silver, will soon restore it to healthy action.

PHIMOSIS.

Phimosis signifies a contraction of the prepuce in front of the glans penis, which cannot be drawn over the glans. This affection may be *natural*, or *preternatural*. The former is congenital; the latter is the result of inflammation, or of the cicatrization of ulcers.

In congenital phimosis, the child is apt to suffer greatly: the urine escapes imperfectly, and a chronic balanitis, may ensue, or calculous concretions form. In after life, the preputial contraction may have the same effect as a tight stricture of the urethra; causing irritability of the genito-urinary system, and organic disease; stricture of the urethra; change in the coats of the bladder; dilatation of the ureters, and finally renal involvement. If the patient obtain old age, without any of these consequences, he is liable to ulceration of the contracted part, which frequently assumes a malignant action, extending to the glans and body of the penis. It is, therefore, important to remove this malformation as early as possible.

Acquired phimosis may be *acute* or *chronic*.

The *acute* form is the result of acute inflammation, and may follow injury of the part; balanitis; venereal sores, or be sympathetic with gonorrhœa. The cellular tissue becomes infiltrated with serum; the swelling prevents the glans being uncovered, and the discharge accumulating, aggravates the disorder.

The *chronic* form of acquired phimosis may result from a gradual increase of congenital formation, or from cicatrization of a wound, or ulcer.

Treatment.—*Congenital* and *chronic acquired phimosis* can only be relieved by an operation, and there is no utility in delaying this remedial means. (See Operations.)

The *acute* form of the disease is susceptible of cure without resort to the knife. The treatment of this variety consists in rest, fomentation, poultice, and general antiphlogistic means. The tumefaction and consequent phimosis will disappear rapidly under the use of the tincture of iodine, applied to on the part by means of a pencil. Under the employment of these remedies, the normal state of the prepuce is generally regained. These failing, it may be necessary to operate, to relieve the patient.

PARAPHIMOSIS.

Paraphimosis is the same deformity or disease as phimosis; that is, a contraction of the prepuce; which, in this case, is behind the glans penis, constricting it, and causing much swelling. This, like the former, may be either congenital or acquired; but the latter is by far the more frequent. Paraphimosis is often occasioned by the patient retracting the prepuce whilst labouring under phimosis, thus producing paraphimosis by his inability to return the prepuce. The superficial cellular tissue swells greatly on each side of the stricture, which is generally a narrow band; the glans swells, also, and acute inflammation is set up, under unfavourable circumstances.

Treatment.—There is the same necessity for speedy relief as in the case of strangulated hernia, so far as the preservation of structure is concerned. Reduction is generally practicable, in recent cases. The surgeon grasps the glans with the fingers of the right hand, and makes steady pressure upon it; at the same time he draws forward the prepuce with the fingers of the left hand, the object being to pass the glans penis, diminished by pressure, through the constricted preputial orifice. Another mode of reduction is by elevating the head of the penis, and letting fall upon it a stream of cold water, which, if continued for some time, the swelling is sufficiently reduced sometimes for the reduction to be accomplished in the manner recommended above.

These means failing, resort must immediately be had to the knife. (See Operations.)

HYPERSPADIAS, or **EPISPADIAS**, denotes a malformation of the urethra, wherein this passage opens upon the back of the penis. It is usually congenital, but may be the result of accident or disease. There may be a vestige of the normal opening at the apex of the glans, the urethra terminating somewhere behind this; or, as more frequently happens, the anterior portion of the canal, to the extent of an inch or more, appears as if slit up, and the margins rounded off. In extreme cases, the whole outer part of the urethra may be imperfect. The inconveniences of the affection are, a scattered and ill-projected stream of urine, and perhaps inefficient emission of the seminal fluid, and a raw, congested state of the exposed mucous membrane. The chasm in the urethra may extend from the glans to the symphysis pubis.

HYPOSPADIAS is an analogous condition of the under surface of the urethra.

Treatment.—When there is rather a slitting up than a deficiency of parts, the edges may be pared, and brought together over a catheter. But when the parts are actually wanting, urethroplasty must supply the deficiency, by a portion of integument taken from the penis, neighbouring perineum, or scrotum, and ingrafted into the hiatus, a catheter being kept in the urethra during the operation and process of cure. In the minor cases, which constitute a great majority, no interference is necessary, the inconvenience being trifling.

IMPERFORATE URETHRA, which is a congenital malformation, can be remedied but in one way; this is by making a passage in the proper direction with a round trocar, and keeping the artificially constructed canal pervious, for a time, by a catheter.

TUMOURS AND MALIGNANT DISEASE OF THE PENIS.

TUMOURS.—The natives of warm climates are liable to sarcomatous growth of the cellular tissue of the penis and scrotum, forming an immense tumour, in which these parts are completely buried.

Cancer of the penis may begin either on the glans or on the

prepuce, and may frequently be traced to the irritation of congenital phimosis, beginning in the preputial orifice by ulceration, and extending thence to the body of the organ.

Diagnosis.—The glans penis is enlarged and indurated, angry ulcers penetrate it in various places; the body of the penis suffers also; the lymphatics on the dorsum swell and harden; the glands of the groin are involved; retention of urine may ensue, by pressure of the secondary tumours on the neck of the bladder; the cachexy advances, and the patient perishes, his end hastened, perhaps, by hemorrhage from the open and deep cancer.

Treatment.—In both these cases the knife, unfortunately, affords the only hope of cure: removal of the tumour is imperative.

Amputation of the penis is had recourse to in cases of malignant disease. (See Operations.)

ELEPHANTIASIS OF THE SCROTUM, or chronic enlargement by hypertrophy, is a simple tumour, by which the genital organs are sometimes altogether concealed, the prepuce alone remaining visible at the lower part of the tumour, thickened and warty: from this point the urine is discharged in a scattered stream. This affection is more common in hot climates than in temperate: it is of very common occurrence at Rio Janeiro, Brazil.

Treatment.—The knife affords the only means of cure. When the tumour is small, the penis and testicles may be saved; but in large tumours they have to be sacrificed. It is necessary to ascertain, before commencing the operation, if scrotal hernia exist: if so, the dissection must be conducted with especial care.

CHIMNEY SWEEPERS' CANCER is a foul, ragged ulcer of the scrotum, with the surrounding skin hardened and tuberculated. This affection rarely, if ever, occurs till after thirty years of age. It commences as a small wart, caused by the irritation of soot.

Treatment.—The whole of the ulcer, and the diseased skin around it, must be extirpated. It is rarely, if ever, necessary to remove either of the testicles.

ERYSIPELAS OF THE SCROTUM frequently occurs in a distinct and marked form, peculiarly asthenic in its type, partaking much of the characters of diffuse cellular infiltration. It occurs in adults

of weak and broken-down systems, given to drink and other dissipation, and usually follows a kick, blow, or other injury.

Diagnosis.—The swelling is rapid, with marked symptoms of constitutional irritation from the commencement. Thin matter speedily forms, and is diffused through the cellular tissue. The skin, at first red, tense, and glistening, blackens, or assumes a tawny hue, shrivels, and becomes cold and fetid, and sloughing commences. Frequently the groins are involved, and the inflammation extends upwards to the abdominal parietes. The constitutional symptoms soon pass from the irritative to the typhoid type, and fatal sinking follows.

Treatment.—The general principles governing the treatment of erysipelas in other positions, must be applied in this case also. Local and general safety can only be obtained by early and active interference, free incision, and constitutional support.

ŒDEMA of the cellular tissue of the scrotum is very liable to occur, either as a distinct affection, or more commonly as a concomitant of general anasarca.

Treatment.—When excessive, relief and diminution may be obtained by making a few dependent punctures; they should be made with care, lest asthenic and diffuse inflammatory action ensue.

Erythema may occur at any time in the scrotum, under the ordinary exciting causes. It follows the same course here, as in other sites, and requires the same treatment.

AFFECTIONS OF THE TESTICLE.

ACUTE ORCHITIS, OR TESTITIS.—Inflammation of the testis may be *primary*, the result of an injury—or *secondary*, the consequence, or attendant, of gonorrhœa. Sometimes it is an accompaniment of mumps, depending, probably, on a metastasis of inflammation. Secondary gonorrhœal orchitis is usually acute, and is the more frequent form of the affection. It is generally called *hernia humoralis*, which does not usually occur until the third week of the gonorrhœa. This affection may be designated as an *epididymitis*; notwithstanding the whole testicle seems to

swell, yet the epididymis is the true seat of the inflammation, which descends along the vas deferens, and passes to the epididymis, the general swelling depending chiefly on acute effusion of serum into the tunica vaginalis.

Diagnosis.—Pain and a sense of weight are felt in the cord and testicle, the skin reddens, and uneasiness is felt in the groin and loins. The swelling and pain increase, often becoming excruciating, with a sensation in the loins as if the back were sawn across. The discharge from the urethra diminishes, and then ceases; an example, generally, not of metastasis, but of the effect of counter-irritation. The scrotal swelling becomes tense, red, glistening, and intolerant of the slightest pressure. The cord is also swollen and painful. There is often great febrile disturbance, with frequent vomiting. This affection has been mistaken for enteritis, from the excessive pain in the lower part of the abdomen.

Treatment.—The treatment should be decidedly antiphlogistic. If the patient be of plethoric habit, general bleeding, leeches, rest, warm fomentations, or cold lotions, low diet, and antimony; recumbency, and suspension of the testicle, to take its weight off the cord. Opiates in full doses, frequently repeated, are of service, and the use of mercury. If the tension be great, open the veins of the scrotum. Much relief is sometimes afforded by perforating the tunica vaginalis with a lancet, so as to evacuate the accumulated serum. After the acute stage has subsided, strong astringent lotions may be employed, and subsequently frictions with mercurial ointment or tincture of iodine, to remove the hardness and swelling which almost always remain after the acute attack, (a fact of which the patient should be informed.) Pressure upon the testicle, by adhesive straps, is very usefully employed for the same purpose. These straps should be applied longitudinally and circularly, with regularity, and sufficient tightness to cause some uneasiness at first, which soon subsides.

CHRONIC ORCHITIS, OR TESTITIS, may be the result of an acute attack imperfectly resolved, or, as more frequently happens, the action is chronic from the first. It may also be primary or secondary, that is, occurring as an independent affection, or as a consequence of gonorrhœa. It often depends upon stricture of the

urethra ; not unfrequently it is of syphilitic origin. The body of the testicle is completely involved, as well as the epididymis, although the latter is usually the first affected.

Diagnosis.—The swelling, at first irregular, extends from the lower part of the epididymis, and involves the whole organ in a firm, inelastic, uniform tumour, usually of an oval form, seldom exceeding two or three times the bulk of the healthy gland. The attendant uneasiness is slight. After some time, the characteristic sensibility of the organ under pressure is in a great measure lost. The pain is usually more severe at night than during the day.

Treatment.—This should consist in the recumbent position, mercury administered until slight ptyalism is produced, bowels kept open, and diet moderately low. The use of the iodide of potassium, or corrosive sublimate, may be found beneficial in some cases. The application of the tincture of iodine to the part, and compression by the bandage of adhesive straps, are very useful in reducing the tumefaction.

ABSCESS OF THE TESTIS may be produced from chronic or scrofulous inflammation, but is rarely the result of the acute form. Central suppuration may occur in chronic orchitis, the matter reaching the surface slowly, and discharging by an external orifice, but it sometimes remains for a long time stationary in the condition of chronic abscess. The fluid portion of the matter may be absorbed, while the solid part remains in a concrete mass, resembling tubercular deposit, but distinguished from it by being confined within a distinct cyst.

Treatment.—A puncture should be made as soon as fluctuation can be distinctly felt, and the skin becomes adherent. After an opening is formed, either by art or nature, part of the tubercular texture of the gland is apt to protrude, in the form of a pink, fungous, irregular mass. This may sometimes be got rid of by pressure with adhesive straps, or by stimulating lotions and ointment ; but if it do not yield to these, it must be removed by the knife.

SCROFULOUS TESTICLE.—Scrofulous inflammation of the testicle is not uncommon. The deposit of tubercular matter takes place

in the aggregate mass, or epididymis, either into or between the tubuli.

Diagnosis.—A slow, painless, nodular tumour appears externally ; the swelling is gradual and very indolent ; little uneasiness is felt. The tumour seldom attains a large size, and the tubercular diathesis is generally indicated by strumous affections in other parts of the body. After a time one of the nodes enlarges, reddens, and becomes painful ; softening and suppuration occur, the integument gives way, pus and tubercular matter are discharged. Other points may soften, point, and break, and sinuses communicate one with another. The sore presents the ordinary appearances consequent upon tubercular softening.

Treatment.—Tonics must be administered to improve the general health ; alteratives, and change of air ; stimulating lotions are sometimes useful. When all the tubercular matter has been evacuated, pressure by adhesive straps, is of use in favouring closure and cure : the abscess sometimes heals of itself. The whole organ is often disorganized and rendered useless.

Atrophy of the testicle.—Gradual wasting of the testicle may follow acute inflammation ; excessive venereal indulgence ; a blow or squeeze, with the intervention of slight inflammation ; cirsocele ; hydrocele ; pressure from fatty and other tumours ; suppuration of the testicle, by destruction of the tubular structure : atrophy of one, or both organs, has been supposed to result from injuries of the head : sometimes it occurs when there is no assignable cause.

Treatment.—Nothing can be done, but to remove the causes, which should be done where it is practicable. But the gland may go on dwindling to the size of a pea : in fact too often there is no cure for it.

Tumours of the testicle.—The testicle is liable to various forms of tumefaction ; the most common is *simple enlargement*, the result of chronic orchitis. The *scrofulous tumour* is not uncommon, and occasionally the fibrous tumour is seen. *Cystic sarcoma* is as frequently formed here as in any other situation. *Carcinoma* and *Cancer* are not of frequent occurrence. *Cephaloma* has no more frequent site ; sometimes, though rarely, it is combined with

melanosis; sometimes the open medullary tumour degenerates into the condition of *fungus hæmatodes*.

These tumours present the same characters in this as in other sites, and require the same remedial management.

Prognosis.—In cases of malignant formations, prognosis may be more favourable here, than in any other position.

IRRITABLE TESTICLE.—This word is used indifferently, to express mere increase of sensibility, or decided neuralgia.

The former is generally dependent on some affection of the urethra, bladder, kidney, or disorder of the general system. But it may, like the tumid and sensitive breast of the female, be the temporary consequence of change at puberty, or follow excess in venery.

NEURALGIA OF THE TESTICLE, is a formidable disease, attended with much suffering, and but little amenable to treatment. Persons most liable to suffer from this affection are the weak, nervous and dyspeptic; especially if they have indulged much in venereal gratification.

Diagnosis.—There is almost constant uneasiness, with paroxysms of violent pain; little or no enlargement, or other morbid indication is observable; the testis is generally intolerant of pressure, and during the paroxysm, it is retracted close to the groin. Occasionally the affection is combined with cirsocele, seeming to depend upon that morbid condition of the veins. But generally the origin of the affection is as obscure as it is in other cases of neuralgia.

Treatment.—This must be the same as for neuralgia in other situations. Among the best local applications are aconite, belladonna, and nitrate of silver: internally iron, quinine, arsenic, and other tonics. It is too often the case that little improvement follows the most skillful management, and the patient demands castration, to rid him of his sufferings. This operation is seldom if ever to be performed, since neuralgia not being dependent upon a local cause in the testicle, it is therefore, likely to return in the cord.

HYDATID DISEASE OF THE TESTICLE is very rare, and occurs almost exclusively in adults. The testicle swells exceedingly, and

its interior is filled with a number of cysts containing a watery fluid. This affection is incurable, but not malignant.

When the testicle enlarges to an inconvenient size, it must be removed. (*See Operations.*)

HYDROCELE.

Hydrocele expresses a chronic accumulation of serum, in connexion with the genital organs, and may occur in the tunica vaginalis testis, in the cord, or in the sac of a hernia.

Hydrocele of the tunica vaginalis testis, is one of the most common surgical diseases met with. It may follow an injury of the part, or inflammation of the testis; but it more frequently arises without any assignable cause.

Diagnosis.—It is a pyriform swelling, beginning at the lower part of the scrotum, smooth on its surface, fluctuating if pressed, free from pain and tenderness, causing merely a little uneasiness by its weight. The epididymis can be felt at the posterior surface of the tumour, near the bottom. By placing a lighted candle on one side of the scrotum, the light can be discerned through it, the tumour being translucent, except the coverings are preternaturally thick. When distension is very great, fluctuation cannot be felt. The testicle occupies the back part of the cavity, a little below its middle, and cannot be distinctly felt. Sometimes, though rarely, the testicle is situated in front, and can then be felt. Hydrocele may be distinguished from solid enlargements of the testicle, by the weight of the latter, its solidity, greater painfulness, and the absence of fluctuation and transparency. And from hernia, by fluctuation, history, the absence of impulse upon coughing, and the impossibility of reduction by pressure.

Treatment.—Strong discutient lotions sometimes assist the cure in children; but with adults, the treatment must be either palliative or radical, both of which require tapping. (*See Operations.*)

Hydrocele of the Cord may be either diffuse or encysted. The latter is the more common. In the *diffuse* form, a fluid accumulates in the cellular tissue of the cord, and is enclosed in a distinct cellular sheath, which is covered by the cremaster muscle.

Diagnosis.—The swelling is seldom large. It is uniform and somewhat pyramidal, of slow formation, and not attended with much uneasiness. The base rests on the point where the spermatic vessels join the testicle, being separated from the tunica vaginalis by a dense septum, and the testicle may be distinctly felt in its ordinary site. There is no difficulty in diagnosis where the abdominal canal is not encroached upon, but when this is the case, it may be mistaken for hernia. The distinguishing marks between them are, the perfect reduction in hernia, the clearness of the cord after reduction, and the impulse given upon coughing. In hydrocele, fluctuation, ordinarily, is tolerably distinct.

Treatment.—Unless the swelling prove large and inconvenient, it need not be interfered with. Probably the best mode of cure is acupuncture, aided by the external application of tincture of iodine. The punctures should be made at the lower part of the tumour, and need not be numerous, for the fluid readily escapes from cell to cell, and, not unfrequently, they are broken down into large compartments.

Encysted Hydrocele is much more frequently seen than the other form. In this, the serous fluid is contained within a distinct cyst, sometimes of adventitious formation, sometimes formed of an unobliterated portion of the vaginal process of the peritoneum.

Diagnosis.—The growth of the tumour is slow and painless; circumscribed, oval, tense, and fluctuating; often plainly translucent; always movable on the cord, and the testicle can be felt distinctly separate.

Treatment.—In children, discussives are all that is required for the cure of the disease. In the adult it seldom demands much interference; when it does, tapping, injection, or seton, are equal to the cure.

Hernial Hydrocele.—A scrotal hernia having been reduced, and the neck of the sac obliterated, the sac remaining without the abdominal cavity may become filled with serum. This affection is of rare occurrence, and may be easily recognised, by the history of the case, the presence of a pyramidal, fluctuating, and translucent tumour. It is amenable to the same treatment as ordinary hydrocele.

HÆMATOCELE signifies an accumulation of blood in the *scrotum*, *cord*, or *tunica vaginalis*. It may be the result of injury, or be of spontaneous occurrence. It is sometimes combined with ecchymosis of the scrotum.

Treatment.—In this affection the treatment must occasionally be antiphlogistic, but active measures are rarely called for. If the quantity extravasated be small, rest and cold lotions may cause absorption. If large, a puncture may be made, and a poultice applied, for the blood gradually to ooze into.

VARICOCELE, *Cirsocele*, or *Spermatocele*, expresses a varicose condition of the veins of the spermatic cord. It is caused by obstruction to the return of blood, the ordinary cause of varix and the dependent nature of this part predisposing it to the affection. Corpulence, constipation, tight belts round the abdomen, laborious exercise in the erect position; tumours, trusses, and whatever obstructs the upward flow of blood, gives rise to this affection. It is much more frequently met with upon the left, than upon the right side, obviously because the left spermatic vein is more liable to be pressed upon by fecal accumulations in the sigmoid flexure of the colon, and because its course is longer and much less direct than that of the right vein.

Diagnosis.—Cirsocele is chiefly met with among young, vigorous, unmarried men, who have led exemplary and chaste lives. The whole of the cord appears to consist of a bundle or congeries of knotted and tortuous veins, which feel like a bunch of earthworms wrapped around and twisted upon each other. The disease generally shows itself at first at the bottom of the testicle or scrotum, and thence travels up the cord, producing more or less weight, uneasiness or pain. When the patient lies in the recumbent position, the tumefaction subsides, and the veins become soft and flaccid. But upon resuming the erect position, particularly if the upper part of the cord be compressed, the hard tumour reappears; by this means it may be distinguished from all other affections of the parts.

Treatment.—The treatment is palliative, or radical. In ordinary cases, sufficient benefit may be derived from purgatives; frequently bathing the part with cold water, or astringent lotions, with

which it may be kept wet, to constringe the vessels, and, by supporting the scrotum and testicles against the pubes, by a suspensory bandage. For the radical cure, see Operations.

TUMOURS OF THE CORD.—Occasionally, adipose, fibrous, and osseous tumours form on the spermatic cord, and produce inconvenience by their bulk, and atrophy by their pressure. They are to be removed by incision, where they cannot be discussed.

ACUTE ŒDEMA OF THE SCROTUM.—The loose cellular tissue of the scrotum is very liable to serous infiltration. Mr. Liston has described a form of œdema which is liable to follow excoriations of these parts in unhealthy persons. In this case, the scrotum becomes enormously swollen and tense, and soon sloughs, unless free incisions be made in it. This case resembles extravasation of urine, but may be distinguished from it by the absence of swelling in the perineum, and of obstruction in micturition.

IMPOTENCE in the male may depend on a variety of conditions. It may depend upon imperfect development of the testes, but not on their imperfect descent. The organs are functionally as efficient in the abdomen as in the scrotum. Ablation, or atrophy of both organs, causes impotence; but one testicle may be lost with impunity. The oxalic, and phosphatic diatheses, as well as diabetes, diminish sexual appetite. The pressure of hydrocele may cause impotence, even without atrophy of the testis. It sometimes follows affections of the brain. In the newly married, a temporary loss of power is sometimes caused by mental emotion. But the most frequent cause probably, is excessive venery, inducing an irritable state of the whole genital system.

Treatment.—Where impotence depends upon structural change, no benefit can be derived from treatment of any description. Cases unconnected with loss of the necessary organs, may have this animal function restored by various medicines, which are termed *aphrodisiacs*. The most important are Indian hemp, conium, musk, cantharides, steel, and other tonics. Phosphorus in dose of gr. $\frac{1}{40}$ dissolved in oil, is said to be a potent aphrodisiac in cases dependent upon debility. General tonics, cold bathing, dashing cold water upon the genitals, and chastity, are all useful; but must be applied with judgment, and with reference to the cause

of impotence. Diet should be generous. Cases dependent upon mental operations, must be soothed by conversation, and advice calculated to allay the patient's fears for his lost powers: these cases in this way will work their own cure.

SPERMATORRHŒA, expresses an involuntary and frequent emission of the seminal fluid; consequent upon an irritable state of the testicles, seminal vesicles, bladder, and urethra; with a turgid and especially irritated state of the prostatic portion of the urethra.

The most frequent cause of this condition is masturbation; next to this is excess in venereal indulgence. Stricture, prostatic disease, and irritation from diseased rectum, are common causes of the minor forms of this affection.

Diagnosis.—Slight venereal excitement, by day or night, causes emission; semen is often discharged during straining at stool, and by an effort to evacuate the last drops of urine. The testicles are soft, and hang low in the scrotum, which is loose and flabby. Impotence, results from incapacity of erection, as well as by preternatural haste in emission, and the vitiated character of the secretion itself. The digestive organs become deranged; the general health fails; many anomalous sensations are felt; serious diseases are simulated; the countenance wears a dejected expression, and the air and bearing of the subject are those of a poltroon.

Treatment.—The most important point in the management of this affection, is absolute chastity; with this and cheerful society, and healthful occupation of body and mind, a cure is generally effected. Purgatives and other sources of local irritation, are to be refrained from. In cases where the irritability continues, the nitrate of silver should be applied to the prostatic and posterior portion of the urethra: one of the most convenient modes of applying this, is by the porte-caustique of Lalleman. After which, strict rest and low diet must be maintained for a time; sedatives should be given if required, either by the mouth or rectum. Repetition of this application may be required after a few days. But in mild cases, the occasional introduction of a common metallic bougie, may succeed in removing the irritability, and render the cauterization unnecessary. Cold enema, and counter-irritation to

the perineum, may be of service; compression of the urethra, by a pad applied to the perineum, has also been useful.

DISEASES OF THE FEMALE GENITAL ORGANS.

BLENNORRHOEA.—Female children are sometimes affected with a mucous, or purulent discharge from the parts at the entrance of the vagina, which may be excoriated. The treatment consists in perfect cleanliness, purgatives, tonics, and mild astringent lotions.

VAGINAL FISTULA.—There are three forms of this disease, viz.:—*Vesico-Vaginal*, *Urethro-Vaginal*, and *Recto-Vaginal*, which are the result of accidents in parturition: the parts may be torn by the unskilful use of instruments, or the pressure of the child's head may cause sloughing, and thus give rise to this form of disease.

Vesico-Vaginal Fistula denotes an anormal communication between the vagina and bladder. It generally occurs after a tedious labour: some time afterwards sloughs come away resembling portions of washed leather, a gush of urine follows, and a constant draining of that fluid remains.

Treatment.—The treatment is either radical or palliative. The radical cure consists in placing the patient upon her face, the moment the accident is discovered, and passing a catheter into the bladder, which should be constantly worn; an oiled sponge should be placed in the vagina, and the bowels kept moderately loose. By these means the natural contraction of the part being aided, a cure is often effected. If the fistula still remain open, the vagina may be distended by a speculum, and the fistulous portion brought down near the external opening, the edges pared off, and then brought together by suture: the sutures may be easily applied by the instrument employed in staphyloraphé. Success from this operation is not frequent; so rare indeed, that most surgeons are content with palliative means alone. Where the fistulous opening is small, a cure may often be effected by the application of a red hot wire to the orifice, which is gotten at by the aid of a speculum;

this application should not be repeated at intervals of less than three weeks. The application of nitrate of silver sometimes succeeds in creating union. At the same time this treatment is going on, rest and the recumbent position must be maintained.

Palliative treatment consists in occupying the vagina by a restraining plug, and attending to cleanliness. One of the best means of occupying the vagina, is by a gum-elastic bag, enveloped in a piece of oiled silk: it must be introduced in a state of collapse, then inflated, and kept so by means of a stop-cock: by this means accurate compression is made upon the aperture, to prevent escape of urine, whilst comfort and cleanliness are thereby promoted. This apparatus should be employed, also during the effort for radical cure. The gum-elastic should be withdrawn daily and the parts well syringed with a weak solution of chloride of soda or lime, and replaced.

Urethro-Vaginal Fistula denotes a preternatural opening between the vagina and urethra: it is often caused by the imprudent use of instruments. The same disagreeable condition results as in the former case, and the treatment must be the same.

Recto-Vaginal Fistula denotes a communication between the vagina and rectum, from the laceration of the septum dividing them; caused generally by the child's head in difficult labour, or the improper use of instruments. Where the rupture is caused by the passage of the child's head, the perineum is usually divided also.

Treatment.—This does not differ from vesico-vaginal fistula, except that there is greater prospect of success in this case from the application of the suture.

LACERATION OF THE PERINEUM is caused by difficult parturition, and is attended with distressing incontinence of fæces: it is often prevented from healing by the action of the sphincter muscle; still this fissure generally heals.

Treatment.—The parts should be kept clean, and the thighs kept together as much as possible, by means of a bandage passed round them. It may be necessary to apply a slightly stimulating lotion to the part. If it fail to unite by these means, the edges may be pared off and the part brought together, as recom-

mended by some surgeons, by the quill suture. Others, however, looking upon the sphincter as the impediment, divide this muscle upon each side of the fissure, and keep these divisions open by the intervention of lint, until the ruptured portion has united ; then the incisions are allowed to heal.

ABSCCESS OF THE LABIUM occurs from external injury. It is often unconnected with any assignable cause in prostitutes. Pain and swelling are considerable. The moment pus has formed, it should be evacuated by an incision on the vulval aspect of the abscess. If it discharge spontaneously, it leaves a ragged aperture in the mucous membrane. The matter from this abscess possesses an intense and peculiar fetor.

Noma is a term applied to sloughing phagedena attacking the vulva : it is similar, in its nature and treatment to cancrum oris. This disorder is usually found in adults of impaired health, badly clothed, and deficient in cleanliness.

MALIGNANT ULCERS are found occasionally upon the mons veneris and neighbouring parts.

Treatment.—The only remedy for these is the early application of the knife, paring away a portion of the sound structure even, but saving the mouth of the urethra when possible.

TUMOURS OF THE LABIA.—The labia may be the seat of acute inflammation, of encysted, sarcomatous, and fatty tumours. The fatty tumour is oftenest met with.

Treatment.—These tumours must be treated here by the same principles that they are in other situations ; removal by the knife must generally be resorted to.

The Clitoris and Nymphæ are liable to hypertrophy. When they increase to an inconvenient size, they should be removed by the knife, especially as they sometimes take on malignant action.

A Vascular Excrescence is liable to grow in the orifice of the urethra, partly projecting from it, and, from its extreme sensibility, causing intense suffering. In size, it is from that of a pin's head to a horse-bean.

Treatment.—The only remedy for this painful affection is excision, and the application of caustic potassa or nitrate of silver, to prevent reproduction. If caustic potassa be used, oil or acetic

acid must be applied immediately afterwards, to neutralise the potassa.

UTERINE POLYPUS is a firm, fibrous, and pear-shaped tumour, covered with mucous membrane, and usually attached by a narrow-neck to some part of the uterus.

Diagnosis.—It is accompanied with bearing down pains, uterine irritation, menorrhagia, a copious vaginal discharge, fetid, and sometimes bloody, and the general health suffers much. Upon examination, a tumour can be felt projecting through the os uteri, sometimes filling up the vagina. Great care should be used not to mistake polypus for prolapsus of the uterus.

Treatment.—A ligature must be passed round the neck of the tumour by means of the double canula, or rather by two single canulæ. When the ligature has encircled the neck of the polypus, it should be tied as tightly as possible, to strangulate the tumour completely. In course of time the tumour sloughs, and comes away. In the mean time, injections of dilute chloride of lime, or soda, should be frequently thrown into the vagina. The ligature should not be passed too near the uterus.

IMPERFORATE HYMEN.—Sometimes the vagina is entirely closed by this membrane; the menstrual fluid accumulates, causes the uterus to distend, and unpleasant symptoms follow.

The treatment consists in making an incision through the membrane, and washing out the vagina and uterus with tepid water, thrown in by means of a syringe. Not unfrequently the *nymphae* become united in children, the opposing surfaces having been abraded through neglect of cleanliness, or from irritation or inflammation. In general, the adhesion is slight, and may be broken through by means of a probe. For some days after, lint should be interposed, to prevent reunion.

DISEASES OF THE BREAST.

IRRITABLE MAMMA.—The female breast is frequently the seat of irritation. The gland is not altered in structure. Sometimes there is a slight puffiness in the superficial cellular tissue. There is much local uneasiness, and tendency to involve the whole system

in serious disorder. The pain is considerable, not constant, liable to exacerbations, often periodic, and otherwise evincing the ordinary characters of neuralgia, and resembles irritable testis. Aggravation of the symptoms generally occurs at the menstrual period. This affection is found in the young, or those of middle age, who are usually pale, thin, and cachectic.

Treatment.—This disorder is generally symptomatic of disease of the uterus, either in structure, or function, and must be treated accordingly. The use of iron, in functional derangement, and conium, in general irritability of the system, are of service; as well also the local application of the nitrate of silver and belladonna; change of air, exercise, attention to diet, and other correctives of chronic disease, are of great importance.

ACUTE MAMMITIS.—Acute inflammation of the mamma may result from injury, or exposure to cold; commonly it is connected with lactation. It may be known by great tumefaction, tenderness, pain, and fever.

Treatment.—Saline purgatives; free application of leeches, followed by tepid fomentations or poultices; the milk should be drawn, if it can be done without too much pain, and Dover's powder given to allay restlessness. The moment fluctuation is perceptible, a lancet should be passed in, to evacuate the pus or milky fluid accumulated. If the part be slow in healing, astringent lotions may be injected into it.

Chronic mammitis generally attacks one or two lobules only, causing them to swell into hard tumours, or the whole gland may be affected. Young adults are most liable to this affection. The swelling is more diffuse than any other form of genuine tumour; it is not painful; the patient is generally young, and without the leaden hue of cancer; the tumour is less hard also, and feels as if it were composed of numerous small granules.

Treatment.—The digestive and uterine organs must be put in perfect order, by the use of alteratives, aperients, and tonics.

The mammary gland, unfortunately, is a common site for tumour,—as schirrhous, simple sarcoma, fibrous tumour, hydatids, and carcinoma.

Treatment.—In the management of these affections, discussives

should have a fair trial, and sometimes they will succeed in obliterating the commencing tumefaction; if these fail and the tumour continue to increase, or show signs of malignancy, extirpation of the affected portion, or the whole gland, must be resorted to.

The mamilla or nipple is liable to hypertrophy and malignant disease; which must be treated in the same manner as directed for the gland.

Men occasionally suffer from malignant disease of the breast. This requires the same management as in the female.

DISEASES OF THE UVULA, TONSILS, AND ŒSOPHAGUS.

Œdema of the uvula is a frequent result of general inflammation of the fauces. There is a feeling of discomfort in the part, the voice is altered, and a tickling, annoying cough is occasioned.

Treatment.—This consists in the use of astringent gargles; scarification; the application of alum, capsicum, and nitrate of silver in substance.

Elongation of the uvula from relaxation, is not an unfrequent occurrence; the extremity of it is sometimes œdematous and bulbous, sometimes thin and fimbriated. An elongated uvula causes unpleasant titillation of the glottis; and often a very distressing cough, which has been mistaken for bronchitis, or laryngitis.

Treatment.—When the uvula is not extremely long, the treatment in the former case should be applied; but if this fail, or the uvula is very long, and causes much difficulty; then it is necessary to curtail it; this is done by seizing the uvula with forceps, and cutting it off by scissors; leaving a piece about the ordinary length of the uvula.

Acute inflammation of the tonsils, tonsillitis, or cynanche tonsillar.—The glands swell rapidly; there is pain, heat, and redness in the part, with difficult and painful deglutition; alteration of voice, and inability to separate the jaws: fever often accompanies this local affection.

Treatment.—This should be generally and locally antiphlogistic. Leeching, bleeding from the arm, deep scarification of the glands,

and the free application of nitrate of silver, or the use of gargles of capsicum, chloride of soda, the internal use of antimony, and purgatives. Large doses of guaiac are by some considered almost specific: half a drachm of the powder may be given three times a day.

Chronic enlargement of the tonsil or hypertrophy, frequently follows inflammation of the gland, in scrofulous subjects. The part in this condition is liable to repeated attacks of inflammation, beside the inconvenience occasioned by a tumour in the throat, from pressure upon the Eustachian tubes, difficulty in swallowing, and alteration of voice: even suffocation has occurred from this cause.

Treatment.—If the system be weak, tonics and alteratives may be administered; remove decayed teeth that cause irritation, and lance the gums if tumid; employ astringent gargles, as cinchona with alum, or wash the part once a day, by means of a hair pencil, with a strong solution of nitrate of silver, or sulphate of copper. Cases of long standing may often be cured by applying the tincture of iodine, with a camel's hair pencil, to the gland, night and morning, and the application of mercurial, or iodine ointment, or a blister externally: if the use of the tincture of iodine to the gland internally be continued a long time, it generally succeeds. When these means fail in reducing the tumour, and the inconvenience from its presence is great, then the knife must be resorted to, and a large portion of the gland should be removed. This is done either with an instrument constructed for this especial purpose, or the gland being seized by hook forceps, a piece may be shaved off by a scalpel.

Abscess of the Tonsil is the result of acute inflammation, and requires immediate interference. The proper treatment is to open the abscess at once, by placing the forefinger of the left hand upon the tongue, and passing a straight sharp-pointed bistoury through the centre of the tumour, and cutting towards the median line. The gargles before mentioned will then complete the cure. If this affection occur in young persons, they are, for a long time after, exceedingly liable to a return of it, from the slightest cause.

Spasm of the Œsophagus, Spasmodic Stricture, occurs at intervals, the patient finding himself incapable of swallowing upon

the instant, the attempt causing a sense of choking and pain. When there is an *organic* or permanent stricture, the inconvenience is always the same. The passage of a bougie, in spasmodic stricture, meets with slight obstruction, which soon yields, and sometimes is not felt. In permanent stricture, the obstruction is always to be found, and does not yield readily.

Treatment.—This affection is dependent upon a weakened or hysterical state, or upon disorder in some other part. Sir B. Brodie and M. Mayo mention cases that disappeared upon the removal of piles, and the cure of diseased liver. It is, therefore, evident, that the cause must be sought for and, if possible, removed. Tonics should be given where the system is debilitated, and the proper remedies administered for other causes. Exercise, the shower-bath, cold and warm bathing, are of service.

Palsy of the Œsophagus occasions inability to swallow, but is without pain or other symptom of spasm, and the bougie meets with no resistance.

This affection depends upon disease of the brain or spinal marrow, which should be removed, if possible. In the mean time, the patient must be sustained by the use of the stomach tube.

Permanent Stricture of the Œsophagus is a contraction of the passage, by inflammation having caused a thickening of its mucous and submucous coats, in the form of a ring. It is generally situated near the termination of the pharynx. It is more frequently met with in females than in males. It is accompanied with difficulty of swallowing; observed, probably, for years, gradually increasing, and occasionally aggravated by spasm. Swallowing often creates pain in the chest, which shoots through the shoulders and head. A bougie meets with obstruction, and shows the mark of stricture when withdrawn. A fatal termination may result from starvation, the irritation of the local disease, or the extension of ulceration to the lungs.

Treatment.—Employ mercury to the extent of mild ptyalism, and if there be much irritability, give hyoscyamus or conium at the same time. A seton between the scapulæ, occasional touching the part with nitrate of silver by means of a sponge probang, and the passage of a bougie, to dilate the stricture, are all called for.

The bougie ought to be curved to correspond to the passage, and being warmed, should be passed at once to the posterior part of the pharynx, the head thrown well back, and the patient directed to swallow at the same time the surgeon pushes on the bougie.

Schirrhous of the Œsophagus does not differ in symptoms, or treatment, from stricture.

Ulceration of the Œsophagus is generally situated at its upper and posterior part, and causes great pain in deglutition. Upon the passage of a bougie, obstruction is felt above and below the ulcer. The instrument is withdrawn stained with bloody pus, and marked with the ragged impress of the ulcer.

Treatment consists in alteratives, counter-irritants, and nutrient enemata. The burning pain of the throat may be relieved by swallowing small quantities of water, ice, or iced cream.

Tumours pressing upon the œsophagus produce the same symptoms as stricture. The management of these cases is evidently to remove the tumour.

Foreign Bodies in the Pharynx, or œsophagus, produce fits of coughing and a sense of suffocation. They may prove fatal by spasm of the glottis, or by ulceration of the parts, if not removed.

Treatment.—The head should be thrown back, the fingers passed into the pharynx, and the foreign substance extracted by these if possible; if not, they serve as a guide for forceps, with which the offending body should be seized and extracted. The fingers should never be withdrawn on account of attempts to vomit, but after once feeling the substance, they should not lose it until it is removed. If the substance be small, and have passed into the œsophagus, it may be forced down by swallowing bread. If large and soft, it may be pushed down by a probang. But if it cannot be gotten up or down, then it must be removed by *œsophagotomy*, which consists in making an incision into the œsophagus, where the foreign body is felt.

Foreign bodies in the larynx and trachea must be treated after the same manner as when lodged in the pharynx and œsophagus; except that foreign matter must never be forced down the trachea; but must always be removed, even if it be necessary for this object to perform the operation of *tracheotomy*, or *laryngotomy*.

HANGING.

Hanging destroys life in one of three ways. By dislocation, or fracture of the neck, and consequent pressure upon the spinal marrow. By compression of the trachea, suspending respiration, and producing asphyxia. And by compression of the jugular veins, inducing apoplexy.

Treatment.—Produce artificial respiration ; bleed from the arm or jugular vein, if the face be turgid ; dash cold water on the face and chest, and pass a current of galvanism from the nape of the neck to the pit of the stomach, to excite the diaphragm to action.

DROWNING.

Treatment.—If respiration have ceased, recreate it artificially ; wipe the body dry, and rub actively with hot cloths ; warm enemata of turpentine ; place hot bricks, or bottles of hot water in the axillæ, and to the thighs and feet ; the head should be kept up, and the nostrils irritated by ammonia, or titillation with a feather. When the patient can swallow, he should have weak brandy, or wine and water ; after which an emetic of mustard to clear the stomach, and by the effort to restore circulation. Some hours after, the patient may suffer from fever ; which must be relieved by general or topical bleeding, and antiphlogistic means, according to the exigencies of the case. Respiration has been induced with success, by passing a current of galvanism along the diaphragm, by means of an incision below the seventh rib.

BRONCHOCELE, or GOITRE, is hypertrophy of the thyroid gland, which forms a soft, elastic tumour, occupying the front of the neck ; the skin is not discoloured, and the tumour is rarely painful to the touch ; one lateral lobe is frequently larger than the other ; sometimes the isthmus alone is affected.

Treatment.—If the tumour be of recent origin, leeches should be applied, and the patient well purged. In young subjects this disease is generally, or at least frequently, curable, by the in-

ternal use of Lugol's solution of iodine, and the external application of iodine ointment.

GANGLION, TUMOURS OF BURSÆ.—The ordinary seat of ganglion is over the patella, olecranon, the inner side of the head of the tibia, the angle of the scapula, or about the wrist and fingers. If recently formed, it is an indolent, soft, fluctuating tumour, not entirely opaque when a lighted candle is held near it, and generally contains a clear synovia. It is caused by slight blows, twists, strains, or irritation from friction or pressure upon the bursæ, and is mostly found upon the knee or elbow.

Treatment.—The treatment generally recommended is to puncture the tumour with a cataract or grooved needle, so as to empty the sac, and allow the synovia to escape afterwards into the surrounding cellular tissue; when the sac is emptied, pressure by compress and bandage is to be applied, and kept wet with cold water. The punctures must be repeated whenever necessary. If this treatment fail, then recourse must be had to mercurial and stimulating liniments, or blisters, to excite absorption. In obstinate cases it is recommended to dissect out the cyst of the ganglion, provided it has no connexion with the sheaths of tendons, as over the patella or olecranon. In old cases, where the cyst is much thickened, Mr. Key recommends a puncture to be made, and a few silk threads to be passed through the sac as a seton. This creates great suppuration and constitutional disturbance for a time, but destroys the secreting power of the sac, and effects a radical cure. Dr. Wickham recommends, as a means of removing the thickening and stiffness after operation, the use of the vapour or local steam bath. As a general rule, this affection can be cured in a short time, by being well coated three times a day with the tincture of iodine, covered with oiled silk, and firmly compressed by a bandage. In cases where the bursa has discharged and left a sinus, it may be filled with lint saturated with a solution of the sulphate of copper, from one to three grains to the ounce of water.

HOUSEMAID'S KNEE is an acute inflammation of the *bursa*. It sometimes causes great pain, swelling, and fever; it may be distinguished from inflammation of the synovial membrane of the knee joint, by being superficial, and in front of the patella, just

below the skin ; whereas the other is deeper, affecting the joint, being most prominent at the sides.

Treatment.—If much inflamed, rest, leeches, cold, or fomentations, and purgatives should be employed, until all inflammation has subsided ; then the same management as recommended in the previous cases may be pursued.

BUNION is an enlarged bursa on the metatarsal joint of the great toe ; this affection distorts the foot, and sometimes produces a good deal of pain.

Treatment of this case does not differ from the preceding cases ; except that puncture in this situation is liable to leave a troublesome fistula ; for the cure of which Mr. Key recommends a weak solution of creasote.

FIFTH DIVISION.

Diseases of the Arteries—Injuries and Diseases of the Veins—Injuries and Diseases of the Nerves—Venereal Diseases—Gonorrhœa—Gonorrhœa Spuria or Balanitis—Syphilis—Primary Syphilis—Bubo—Constitutional or Secondary Syphilis—Tertiary Syphilis—Diseases of the Bones—Non-malignant Tumours of Bone—Malignant Tumours of Bone—Diseases and Injuries of Joints—Injuries and Diseases of the Ear, Deafness and its Causes—Injuries and Diseases of the Eye.

DISEASES OF THE ARTERIES.

Degeneration of tissue is the result of a variety of pathological changes which arteries undergo; the causes of which may sometimes be obscure, but is generally referable to previous inflammation. The most common of these *degenerations*, are *cartilaginous* or *osseous* deposits between the lining membrane, and the proper tissue of the vessel: *thickening* of the lining membrane: *steatomatous deposits*, *ulceration*, and *softening*. These pathological changes produce various diseases; as dilatation, hypertrophy with dilatation, contraction, rupture, obliteration, and aneurism.

Dilatation of the coats of the arteries takes place by alteration in their powers of resistance, owing to pathological changes; so that they yield to the force of the circulating fluid.

Hypertrophy with dilatation occurs in the uterine arteries during utero-gestation; in aneurism by anastomosis or vascular nævi, and in aneurismal varix.

Contraction is a diminution in the capacity of an artery; it is generally observed in the larger vessels; the aorta is sometimes constricted as if by a cord drawn tightly around it, so as nearly or quite to obliterate its calibre.

Rupture of an artery is occasioned by violence, and generally upon a vessel weakened by degeneration of its coats; and may either cause the death of the patient, or create aneurism.

Obliteration of an artery may be occasioned by a variety of causes; inflammation being the most common. The consequences of obliteration of an artery are gangrene, paralysis, and death.

ANEURISM.

An aneurism is a pulsating tumour containing blood, and communicating with the interior of the heart or an artery, by the dilatation, wound, or rupture of which it has been produced.

Aneurisms are variously divided, as external, internal, spontaneous, traumatic, true, false, circumscribed, diffused, dissecting, varicose, aneurismal varix, and aneurism by anastomosis.

According to Sir A. Cooper, there are three forms of *external* aneurism; which expresses an aneurism upon the surface, where access may be had at it: the extremities generally being the site. At *first* there is a small tumour pulsating very strongly, which only contains fluid blood, and can be readily emptied by pressing upon the artery, between the tumour and the heart. There is but little pain at this time; except in cramps of the limb below the aneurism. In the *second stage*, the tumour is larger, more solid, and cannot be completely emptied, as in the former case. The blood has partly coagulated in the interior of the sac, and its walls are much thickened. The circulation in the surrounding parts is retarded, and pain created by pressure of the tumour. The pulsation is distinct, but not so strong as in the first stage. In the *third stage*, the tumour is larger and more solid; pulsation indistinct. At this time the sac is nearly filled with layers of fibrous matter, and contains but little fluid blood. There is great pain, and inconvenience in moving the limb, which becomes œdematous, and sensation is almost lost from pressure upon the nerves.

Internal Aneurism occupies the cavity of the abdomen, chest, and cranium, rendering diagnosis difficult.

True Aneurism consists in a sac composed of one or more of the arterial coats. But some authorities call all aneurisms false, that are not covered by all the coats of the artery.

False Aneurism is a tumour formed upon an artery, by the dilatation of lymph or fibrin deposited after a puncture of the vessel. By some authors, the circumscribed sac is formed of cellular tissue. Mr. Liston says: "False aneurism is the most common form of disease following accidental wounds of the artery at the bend of the arm.



"As here seen, the vein is stretched over the fore part of the sac, compressed, and, perhaps, obliterated. The cicatrix appears stretched and thin on the surface of the tumour, and there is sometimes a degree of blue discoloration around. The progress of the tumour is steady and uninterrupted, until operative procedure is resorted to."

Diffuse Aneurism is formed by the blood escaping from a wound in an artery into the surrounding cellular tissue, which forms the sac of the aneurism.

Dissecting Aneurism is where the blood passes between the coats of the artery, separating or dissecting one from the other, and may enter the same vessel at any other point.

Varicose Aneurism is where a vein and artery have been punctured at the same time and place, and a false aneurism formed between them, communicating with both vessels.

Aneurismal Varix is where a communication by puncture is made between an artery and vein; the two vessels adhere, and the communication remains permanent, the vein has arterial blood forced into it, and becomes enlarged, and communicates a vibrating thrill at each pulsation.

Mr. Liston describes aneurismal varix as follows: "If the artery

happens to be wounded in opening a vein at the bend of the arm, there is a chance of a communication remaining between the two vessels, when the accident has either not been noticed, the flow of blood not being impetuous and per saltum, the opening being probably small, and the direction of the artery, and the ordinary figure of 8 bandage having been applied lightly, as after ordinary venesection, or when the existence of wounded artery has been known, and inefficient means adopted to restrain circulation in the part of the vessel implicated. The opening in the external aspect of the vein, and in the integument, closes as usual; no extravasation takes place betwixt the vein and artery, and their coats become firmly agglutinated. The opening of communication is soon rounded off, is perhaps slightly enlarged, and becomes permanent. The arterial blood is poured into the vein, at each contraction, in a small and forcible stream, occasioning a peculiar thrill and sound.



The veins appear to be over-distended, and, for a time, there may be slight swelling and discoloration of the limb. The inconvenience arising from this state of matters is trifling, and soon ceases to be felt; no interference is necessary. This is aneurismal varix."

Aneurism by Anastomosis is situated generally in the subcutaneous tissue of the head and neck, and sometimes in the orbit. The tumour is composed of enlarged arteries and veins, which freely communicate with each other.

Nævus is an analogous affection, consisting principally of small arteries, forming a species of erectile tissue. It appears after birth, as a red shining spot in the skin. This remains stationary sometimes, but often enlarges, forming a soft, dusky red, pulsatory tumour, and profuse bleeding may occur from the slightest abrasion of it. This affection is sometimes seated under the skin,

which remains healthy ; but in this case, also, it may ulcerate or slough, and cause repeated and dangerous hemorrhage.

Circumscribed and *diffused* aneurisms merely relate to the extent of the extravasation.

The predisposing cause of aneurism is some constitutional tendency to arterial disease. The *exciting* causes may be mental emotion, local injury, or violent exercise. It is generally found in subjects between thirty and fifty years of age. Men are more subject to it than women, particularly persons who habitually use violent exercise.

Aneurism is generally supposed to commence by laceration of the internal and middle coats of the artery, when diseased. It may also commence at a diseased spot, by dilatation of all three of the arterial coats. Scarpa asserts, however, that "there is only one form of this disease ; that, namely, caused by a rupture of the proper coats of the artery, and an effusion of arterial blood into the cellular sheath which surrounds the ruptured artery."

An aneurismal tumour gradually dilates, under the impulse of the heart's action, and communicates with the artery by a distinct rounded opening. It becomes lined with coagulated blood, deposited in concentric laminæ, the outer ones being the palest and firmest, and if the two inner coats were entire originally, they soon disappear by absorption. It sometimes happens that aneurisms commence by the blood passing into small cysts or abscesses, developed between the coats of the artery.

Diagnosis.—Pulsation in the tumour ; cessation of pulsation and diminution of the tumour, when pressure is made upon the artery above it ; being reduced in size by pressure upon the tumour ; upon application of the ear, or stethoscope, a peculiar purring, or bellows' sound is observable. Tumours and abscesses situated over arteries have pulsatory motion communicated to them, by the impulse of the artery upon which they rest ; but these swellings, when raised by the fingers from their base, lose the pulsations and are not changed in volume, either by direct pressure, or compression of the artery above them.

Prognosis in aneurism is exceedingly unfavourable ; death generally occurs sooner or later. The tumour increases in size, causing

the absorption of bone and other tissues with which it comes in contact, and at last inflames; sloughing follows, and fatal hemorrhage ensues, which often destroys life at one gush, but oftener oozes away slowly, and the patient gradually sinks under it. Yet it must be remembered, that spontaneous cure, by nature's efforts alone, has occurred.

Treatment.—Unfortunately, little can be done by medical treatment in this disease. The patient should not be kept too low. Strict attention should be paid to regimen, whilst violent mental and bodily exercise, as well as the use of stimulants of every kind, are to be avoided. Bleeding may be called for occasionally, if the subject be plethoric. For the surgical management of this affection, see Operations.

INJURIES AND DISEASES OF THE VEINS.

WOUNDS.—Hemorrhage generally, from wounds in veins can be arrested by pressure: ligature should never be applied when it can possibly be avoided, it is better to keep up unremitting pressure by the finger, when ordinary compression will not suffice.

INFLAMMATION OF VEINS, PHLEBITIS, is either *acute*, or *subacute*. *Subacute* inflammation is not dangerous; it generally affects varicose veins of the lower extremities. It may be recognised by tenderness of the vein, swelling around it, œdema below, and painfulness of the limb generally. After it subsides, the vein is like a hard cord, from the inflammation causing the coagulation of blood and the effusion of fibrin, which renders it thick and impervious.

Treatment.—This consists in rest, leeching, fomentations or cold lotions, elevation of the limb, and purgatives: subsequently, stimulating frictions, and pressure: if the œdema be troublesome, it may be relieved by puncture.

ACUTE PHLEBITIS is generally a fatal disease. It is caused by wounds, as venesection; also by ligature, and sometimes, by bruises; puerperal fever; phlegmonous erysipelas, and diffuse inflammation of the cellular tissue.

Diagnosis.—Repeated rigor, rapid pulse, anxiety of countenance, depression of spirits, swelling and tenderness over the vein, tongue furred, brown, dry, or black; pulse rapid and weak, skin sallow, with great prostration: low delirium and bilious vomiting follow, and death supervenes in two or three days from the first sign of disease. But the most characteristic termination, is consecutive abscess: the patient remains low, and suddenly complains of excessive pain in some joint, which is rapidly succeeded by a copious formation of pus; this is followed by others, in the lungs, liver, or other joints, and death ultimately follows, from irritation and exhaustion.

Treatment.—Leeches frequently applied, followed by fomentations to the part; abscesses should be opened early; bowels kept open, and pain allayed. Stimulating or depleting means must be employed, according to the demands of the particular case. Bleeding may be called for, if the patient be robust; wine and tonics used, if he be feeble. Mercury may generally be resorted to, unless the system be greatly depressed.

VARIX signifies hypertrophy of the veins; they are divided into irregular pouches, the valves being incapable of sustaining the reflux column of blood. It may be caused by habitual standing, constipation, the gravid uterus, or anything that retards venous circulation. It is mostly seated in the veins of the lower extremities, scrotum, and rectum.

Varicose veins in the lower extremities are troublesome, by producing pain, fatigue, ulceration, dangerous hemorrhage from bursting, inflammation, and abscess.

Treatment.—Is either *palliative* or *radical*. The *palliative* means are intended to prevent enlargement, and cause contraction of the veins, and consist in the application of pressure upon the enlarged vessels, by means of leather spread with soap plaster, mercurial or iodine ointment. If the number of veins enlarged be numerous, a laced legging or the starch or dextrine bandage should be applied, to keep up constant and uniform pressure. Constipation should be prevented; when the patient has no occasion to use the limb, it must be elevated, to drain the veins by gravity.

The *radical* cure must be resorted to, if the palliative means fail in affording relief, and the inconveniences of the disease continue. See Operations.

INJURIES AND DISEASES OF NERVES.

Complete division of a nerve produces loss of motion or sensibility of the part to which it is distributed; but divided nerves unite readily, and sensibility returns in about three, and motion in about four weeks after the accident. A nerve is capable, also, of reuniting and recovering its functions, even after a section of it has been removed; still, this is not always the case, for sometimes the divided extremities retract, and become bulbous.

Partial division of a nerve may cause very disagreeable effects; as paroxysms of severe pain shooting along the nerve; violent spasms, or palsy; fits of epilepsy, and disorder of the digestive organs. This partial division of a nerve often occurs in venesection. The same symptoms may ensue after a nerve has been stretched, bruised, or compressed; which often happens after amputation, by compression of the nerve in the cicatrix, causing pain, spasm, and retraction of muscle, thereby leaving a conical stump.

Treatment.—If the symptoms supervene immediately after a wound; an incision may be made, to divide completely nerves but partially so. But if they appear during the period of cicatrization, it is better to remove the cicatrix entirely: but, unfortunately, removal of the cause of neuralgia, does not always remove neuralgia itself, for very disagreeable consequences often ensue, as palsy, numbness, pain, and spasm, after injury of a nerve; as the pressure from crutches in the axilla, a violent stretch, blows on the ulnar nerve, etc.

The Treatment employed in these cases, where the knife is not resorted to, is leeches, blisters, and the application of mercurial, or tartar emetic ointment.

Inflammation of nerves may be recognised by tenderness, pain, and fever. *Sciatica* is a rheumatic inflammation of the sciatic nerve.

The Treatment of inflammation of a nerve must be antiphlogistic, either active or otherwise, as the case demands.

Tumours in a nerve produce the local and general symptoms of nervous irritation: the painful subcutaneous tumour, before treated of, is an instance of this kind.

Treatment consists, at first, in counter-irritation, and all the means calculated to excite absorption; if these fail, then extirpation of the part must be resorted to. But even this cannot be resorted to, if the tumour be imbedded in the centre of a large nerve—the sciatic, for instance; for in this case, paralysis would ensue, which would be worse than the original disease.

Tic douloureux and other forms of neuralgia, not spoken of here, fall within the peculiar province of the physician.

VENEREAL DISEASE.

The history of venereal disease is involved in great obscurity. It was maintained for a long time, that the returning ships of Columbus's fleet carried this disease from America, and introduced it thus into Europe, about the last of the fifteenth century. The question of the antiquity of this disorder has been fully examined into, and it is now believed to be one of the diseases of antiquity, dating anterior to the time of Celsus, and known to the Arabians.

Venereal disease signifies the effects of a certain animal virus, engendered and communicated by promiscuous sexual intercourse. It consists of two varieties, gonorrhœa and syphilis. The first signifies an inflammatory affection of the urethra; the last, often a contamination of the whole system, preceded by pustular ulceration on some part of the body, generally the genital organs.

Gonorrhœa has two classes of symptoms, *primary* and *secondary*: the first consists in the inflammatory affection of the mucous membrane of the urethra; and the latter, in succeeding rheumatic affections, which, though met with, are rare.

Syphilis has three classes of symptoms, as *primary*, *secondary*, and *tertiary*.

GONORRHOEA.

Gonorrhœa is an inflammation of the *urethra*, or *vagina*, caused by the application of gonorrhœal matter, usually during sexual connexion.

Diagnosis.—There is a period of incubation: the discharge may show itself in a few hours after connexion, or several days may elapse before it appears. The fifth day is the average period of accession.

At first, there is a slight sensation of heat and itching in the glans penis, which seems fuller and redder than usual; the orifice of the urethra is tender, red, and swollen; the urine is passed in a small stream, with increasing heat and smarting. A little discharge exudes from the urethra, at first whitish and thin, but soon becoming thick and puriform; when the inflammation reaches its height, the discharge becomes yellowish, or greenish, and probably tinged with blood; the penis swells and becomes painful; the stream of urine is forked, or diminished, and the pain in micturition is intense: sometimes there is general fever; at others, the constitutional disturbance is but slight. There is a dull, aching pain in the thighs, loins, and testicles. These are the ordinary symptoms accompanying gonorrhœa; but there are others which frequently appear in this affection, as *chordee*, which is either *inflammatory* or *spasmodic*. It is a painful abnormal erection of the penis, in the form of a bow; the cells of the corpus spongiosum being but partially filled with blood, owing, probably, to the effusion of lymph into them, the result of irritation; thus, whilst the cells of the corpora cavernosa are fully distended, the imperfectly distended corpus spongiosum acts as a bridle, and bends the organ forcibly downwards. The tendency to chordee is always greater during sleep.

The glans penis may become excoriated, and discharge matter profusely, forming *spurious gonorrhœa*. The prepuce may become œdematous and enormously swollen, producing *phimosis*, or *paraphimosis*, either of which aggravates the disease. The lym-

phatics may be irritated, and enlargement of the inguinal glands occur, constituting *sympathetic bubo*.

Abscesses may form in the penis, or in the perineum.

Inflammation of the prostate gland, *prostatitis*, may follow, from extension of inflammation, or by metastasis, and abscesses may result, causing temporary retention of urine subsequently, rendering urinous abscess probable.

Acute cystitis may result either from continuity or by metastasis of inflammation, aggravating all the local symptoms, and, by general disorder of the system, even endangering life.

Acute rheumatism may supervene, the knee and ankle joints being mostly involved. This occurs sometimes during the acute stage, and sometimes during the decline. Gouty symptoms are sometimes excited in those of advanced years and better walks of life.

ORCHITIS.—*Hernia humoralis* is common in protracted cases. Sometimes it seems to be the result of metastasis, whilst at others it appears to pass from the posterior part of the urethra to the vas deferens, and thence to the epididymis and testicle. During the acute stage of orchitis, the discharge from the urethra diminishes or wholly disappears, and as the orchitis declines, the discharge generally reappears.

Orchitis may be caused at any period of the disease, either by a blow, irritating injections, or excessive exercise; but it usually occurs in the chronic stage, weeks probably having elapsed from the first appearance of the gonorrhœa, before the gland is affected.

Hemorrhage from the urethra occasionally occurs by exhalation of blood from the distended capillaries, or by laceration of the vessels from violent erections. The loss of blood generally relieves the case.

Inflammation and obstruction of the mucous follicles of the urethra, which sometimes suppurate and burst into the urethra, or externally, or both, occasionally occur.

GORRORRHEA SPURIA, VEL EXTERNA BALANITIS, is an inflammation and suppuration of the sebaceous follicles around the *corona glandis*, with or without excoriations.

Gonorrhœa is variable in its severity. It is more severe the first

time a patient contracts it than at any subsequent attack, and in very young subjects, or in irritable and scrofulous constitutions. It may even prove dangerous to life, by forming abscesses in the region of the bladder.

It should be remembered that inflammation and purulent discharge from the urethra may be produced by many other causes than gonorrhœa. Discharges resembling this disease may follow *local violence*, as the introduction of instruments into the urethra, blows on the perineum, violent bending of the penis during erection, jolting in a vehicle, or riding on horseback. Inflammation of the urethra, with discharge, may be produced by various disorders of the constitution. It has been met with as a symptom of *rheumatism*, and not unfrequently has been found to precede a paroxysm of gout. It may even be caused by sympathy with other irritated parts, as piles or the cutting of teeth. A patient labouring under *stricture* is very liable to have a discharge, which has frequently been mistaken for gonorrhœa. A discharge from the urethra is liable to recur upon the slightest exposure, in those who have been long and frequently habituated to it. It may be brought on by neglect of health, exposure to cold, extreme fatigue, excess in eating, drinking, or venery. Discharges from the urethra have been known to follow the use of certain medicines, as guaiacum, cayenne pepper, &c.

The menstrual fluid is capable of creating inflammation of the urethra in the male, accompanied with violent scalding, chordee, and swelled testicle. A great degree of irritation may be produced by the vaginal secretions previous to menstruation; and even the ordinary secretions of the vagina of some women are sufficient to create a discharge in a susceptible or irritable urethra.

Leucorrhœa, or any discharge of this nature, is equal to the creation of a mucous discharge from the urethra.

GONORRHŒA IN THE FEMALE is a more simple and less painful disease than in the male.

Diagnosis.—The symptoms and appearance of the parts are much the same as observed in the male.

One of the most important questions in this affection in the female, is the possibility or impossibility of distinguishing between

simple gonorrhœa and *venereal* gonorrhœa, or *clap*. It may be stated decidedly that there is no possible way of distinguishing one disease from the other. It matters not how the urethral disease may be excited, it is the same in its nature and symptoms, and calls for the same remedial management, which must be directed to the cure of *urethritis*.

It is well worthy of remark, also, that from whatever cause the discharge may have arisen, yet it is capable of exciting the same kind of discharge in a healthy person,—in other words, may be communicated by sexual intercourse.

Prophylactic Treatment.—Immediately after connexion, where there is suspicion of disease, the person should urinate and wash the orifice of the urethra well with soap and water, or with a solution of the chloride of soda diluted with water. If he be subject to gonorrhœa, it is better to throw these into the urethra by a syringe.

Treatment.—The curative treatment of gonorrhœa varies according to the stage in which it is applied. The remedies are threefold: the first are antiphlogistic in their action; the second are diuretics, which have a peculiar action upon inflamed mucous membranes; the third are composed of injections, which alter the action of the inflamed capillaries. These may be combined in various cases.

Gonorrhœa is an affection capable of self cure, at least to a certain extent. The intensity of the disease gradually subsides, and there is left but a thin mucous discharge termed *gleet*, which is capable, however, of becoming again copious and thick, upon excess in venery, exercise, or imprudence in diet. It may be even more severe than the original gonorrhœa.

At the first intimation of the disease, either before, or just as the suppurative crisis has commenced, the disease may be arrested by the injection of a strong solution of nitrate of silver, from eight grains to one scruple to the ounce. A glass syringe must be employed for the purpose. A coagulated film is formed, which protects the mucous membrane beneath. The action of the remedy is antiphlogistic, and may probably have the effect of chemically neutralizing the virus. This injection may be employed once a day, yet not often

repeated ; if it cure it will cure quickly, but it is a severe remedy, causing much pain, and often hæmaturia. Or the injection may consist of alum and sulphate of zinc, each a scruple, with four ounces of water. This treatment must be combined with low diet, rest, and aperient medicines. The treatment in acute gonorrhœa should always be antiphlogistic, sometimes even actively so. Bleeding from the arm, but oftener leeching the perineum, may be called for. Cold applications to the part are always useful. Diet should be low, and the patient advised to rest as much as possible. Diuretics should be avoided, but the moderate use of flaxseed tea, or slippery elm directed. The bowels should be kept free by salts and antimony combined, with the occasional use of calomel, or blue mass, in severe cases. It is better to subdue the inflammation before employing injections, copaiba, or cubebs, except, as before stated, just at the invasion of the disease, the employment of nitrate of silver. There are many who do not wait, but administer the remedies at any stage of the disease, and generally without any bad results.

A patient coming to a surgeon with an acute gonorrhœa, the discharge of matter being pretty free, the following modes of treatment may be adopted. If there be much general fever, bleed from the arm ; if the penis and neighbouring parts be hot and swollen, leech the perineum. Place the patient on low diet, and direct rest and cold hip-baths. Give a mercurial purge, followed the next morning by an ounce of salts and half a grain of antimony. He may then take thirty or forty drops of copaiba, three or four times a day. It should not be forgotten that this remedy, if too long continued, is apt to impair the stomach, and create dyspepsia. It should not, therefore, be continued over eight or ten days. Or cubebs may be given, in two or three drachm doses, three or four times a day, for the same length of time. This treatment generally suffices for the cure of ordinary cases. Various injections are capable of curing this disease, and may be used either with or without cubebs, or copaiba : an injection of sulphate of copper, from two to five grains to the ounce of water, or sulphate of zinc, three to six grains to the ounce of water, or zinc and alum may be mixed of the same strength ; sugar of lead from

five to ten grains to the ounce of water, or a solution of the chloride of soda, one or two drachms to the ounce of water.

An excellent mode of applying nitrate of silver to the urethra, is to cut the end off a gum catheter, and place in it a piece of sponge fastened to a wire; saturate the sponge with the solution of nitrate of silver of the desired strength, pass the bougie thus armed into the urethra; when far enough in, push forward the sponge just beyond the bougie, and draw the whole out together. In this way the sponge wipes clean the urethra, and applies the caustic directly to the membrane.

I have found the following mode of treatment, in gonorrhœa and gleet, far preferable to all others. Take of the powdered root of the *Hydrastis Canadensis*, (called Yellow Root or Golden Seal,) half an ounce; water, eight fluid ounces, and make a cold infusion by shaking the powder and water together in a bottle; after the powder subsides, inject the clear infusion into the urethra four or five times per diem, always using the injection directly after the patient has urinated. Direct the cold hip-bath to be used, and abstinence from all unnecessary exercise and indulgence at table. No other treatment is necessary. This injection can be used at any period of the disease, and generally acts admirably, dissipating the disease in from three to ten days; it allays the pain and scalding in the part, and chordee is of rare occurrence, and orchitis or hernia humoralis scarce ever follows. The *Hydrastis Canadensis* is strongly narcotic, tonic, and astringent, and is superior to any remedy I have employed in gleet and chronic irritation of the urethra.

It is an excellent rule in the management of gonorrhœa, particularly when chronic, to pass a tape, or narrow roller, around the penis, beginning at the glans, and putting the bandage smoothly and firmly on, carrying it up to the pubes, so as to produce constant and firm pressure. This may be more readily done, by introducing into the urethra a gum-clastic bougie. The penis and bandage should be kept wet with cold or sugar-of-lead water. Scalding in urinating, *ardor urinæ*, may be relieved by the combination of alkalis and sedatives, and the cold or tepid bath.

Chordee is a painful attendant on gonorrhœa, and may be re-

lieved by the administration, at bedtime, of full doses of colchicum, or a pill of opium, one grain, camphor, and powder of hyoscyamus, each five grains; or by a half grain to a grain of calomel, an eighth to a quarter grain of tartar emetic, and ten grains of Dover's powders every night, whilst the chordee lasts, using cold hip-baths at the same time.

Gleet, or chronic discharge from the urethra, is best managed by the introduction of a catheter or bougie, large enough to fill without stretching the canal; also, the introduction of such a bougie with the penis firmly bandaged upon it, to produce equable pressure; or the injection of the infusion of the *Hydrastis Canadensis* is the most effectual, or of zinc and alum, with the internal use of cantharides, combined with steel or zinc, and keeping the bowels regular: buchu and uva ursi are useful. If the constitution of the patient be shattered, tonics, cold bath, and chastity should be recommended.

Treatment of Gonorrhœa in the Female does not differ from the same disease in the male, except that the parts are not as irritable and painful, and strong applications are borne with little inconvenience; the vagina may even be touched with the solid nitrate of silver.

Gonorrhœal Rheumatism, the secondary effects of gonorrhœa, does not call for different management from rheumatism by any other cause, and must therefore be treated as recommended for this affection under other circumstances.

SYPHILIS.

Primary syphilitic ulcers may be caused by the application of the syphilitic virus to any surface, mucous or cutaneous, whether they are entire, broken, or ulcerated. The most frequent site of a chancre is the genital organs. There is great difference of susceptibility in different individuals: persons who have the glans habitually covered by the prepuce and a delicate semi-mucous membrane, are much more liable to contract the disease than those with the glans uncovered and protected by a firmer cuticle.

The strictly local nature of primary syphilis is now a settled question. From the local infection a constitutional disease may result, which will be dangerous to the individual and his posterity. We are indebted more to M. Ricord, for correct knowledge and clear views of this disease, than to any former observer and writer on the subject; and this affection is much better understood at present than it was before his time.

Chancre, to be properly understood, must be studied in its different phases. The disease has two stages or periods; first, the period of increase, or stationary, in which it furnishes an inoculable secretion; secondly, the period of separation, when it assumes the form of simple ulceration, and is no longer contagious.

M. Ricord's experiments led him to make the following conclusions:—

Chancre can only be recognised with certainty by the quality of the matter it secretes, and the constitutional symptoms it develops.

Chancre alone can produce chancre.

Inoculation never fails, if the proper conditions be observed in taking and applying the matter.

The matter of the pustule of inoculation is equally virulent with that of the original sore.

The pustule is always developed on the precise point where the inoculation was performed, and never at another.

The chancre of inoculation is never preceded by phlegmon, unless the matter have been introduced into the cellular tissue or a lymphatic vessel.

The constitutional malady which results from this antecedent only, is not a necessary consequence of it, and appears only when the primary disease has endured for a certain time.

In order to perceive the truth of this important observation, it is necessary to distinguish between the real and factitious commencement of the disease; that is, to date its commencement from the day on which it was contracted, and not from that on which it was first perceived. By making observations in this way, it will be found, that if the sore be destroyed by caustic, or other means, on the third, fourth, or fifth day after the application of the cause, all risk of constitutional infection is removed.

Indurated, or Hunterian chancre, is the common antecedent of constitutional syphilis. Induration commonly commences on the fifth day ; it apparently announces that the poison is entering the system, and in so far as it has not occurred, the disease may be regarded as still local.

These experiments also prove,—

That the fact of an individual *having been*, or *still being*, the subject of chancre, does not prevent his contracting other chancres to an indefinite number.

That chancre does not multiply itself ; *i. e.*, if a man be affected with a primary syphilitic sore, we never see sores of the same nature appearing on other parts of the body, unless from the application of matter from the first sore, or by contagion from another individual.

The presence of constitutional syphilis is no hindrance to the occurrence of chancre.

The frequency of secondary symptoms bears no proportion to the number of primary sores developed at the same time.

BUBO.—It was a question much agitated in former times, whether bubo should be regarded as a symptom of syphilis, that is, whether it can be a source of general poisoning. The experiments of M. Ricord on this subject led him to the following conclusions.

Bubo may be the result of simple inflammation, which arises either sympathetically in the part affected, or by the gradual propagation of the inflammation, whether the primary lesion be gonorrhœa or chancre.

It may be virulent, that is, due to the direct application of the poison by lymphatic absorption. This kind is the legitimate consequence of chancre, for chancre alone can produce it.

It may be superficial or deep, or both at the same time.

It may be situated in the cellular tissue, in a lymphatic vessel, or in glands, or in the cellular tissue and a lymphatic vessel, or in all three at the same time.

It may be acute or chronic.

It may be preceded by other symptoms, or be itself the first.

When it is preceded by other symptoms, it may either immediately succeed these, and constitute what is called chancre by

succession, or it may occur when the disease has become constitutional, and form a secondary symptom.

"It was some time," says M. Ricord, "before I discovered the reason why all buboes are not inoculable; why a bubo which does not furnish an inoculable purulent matter to-day, supplies it to-morrow; and why, in multilocular buboes, we find an inoculable matter at one part and not at another. I learned to experiment with greater precision; I inoculated the matter which first escaped on opening the bubo, and generally without any result; I then inoculated with matter taken one or more days after the opening was made, which frequently gave rise to the characteristic pustule. In many cases the inoculation continued innocuous, and I found that all these buboes, which did not supply an inoculable secretion, followed the course of simple phlegmon, and advanced towards a cure, while those which secreted an inoculable purulent matter speedily assumed the characters of chancre.

"But it might be argued that those buboes which at first furnished a secretion which was not inoculable, acquired the power of secreting a specific pus, by the application of matter from the chancre or some other cause. A case occurred which explained this difficulty. A patient came under my charge with a large suppurated bubo connected with chancre. I opened the abscess, and after having evacuated the pus from the cellular tissue, I found an enlarged lymphatic gland in the middle of the cavity, which presented signs of fluctuation. I punctured the gland, and inoculated at the same time with the matter which escaped from this latter, and that which flowed from the surrounding cellular abscess. The result proved that the difference in the result of these experiments depended on my not looking for the virulent matter where it is to be found.

"After this I instituted a series of experiments which prove that inoculation is not a fallacious test. I made choice of buboes which were well advanced, and were preceded by chancre; I inoculated with the matter which escaped on their first being opened, and again with that found at the bottom of the cavity. The first inoculation was innocuous, while the second gave rise to the characteristic pustule."

Bubo is frequently the first and only symptom complained of,

and is generally observed about a fortnight after the suspected coitus. Inspection commonly proves that a chancre does or has existed; but cases sometimes occur in which bubo is in reality the first symptom, constituting what M. Ricord calls *bubons d'emblées*; he states that in such cases, the deep-seated glands are first affected, that their progress is chronic, and that they evince little tendency to suppurate.

When the *bubon d'emblée* suppurates, the matter is never inoculable.

He has never found it succeeded by symptoms of secondary syphilis.

Virulent bubo, resulting from the absorption of the matter of chancre, is identical with chancre in nature, and differs from it in form only, and generally affects the superficial glands. The symptomatic bubo is the only inoculable species. All the signs indicated by authors as characteristic of virulent bubo, only serve to establish a probable diagnosis, and inoculation alone is an unexceptionable test.

Constitutional or *Secondary Syphilis* is not inoculable, and consequently not contagious.

The matter of chancre can alone produce chancre. If, therefore, a chancre appear after the contact of other matters of secretion, it is because these secretions were mixed with the matter from a syphilitic sore, in proper proportion. It is thus that saliva from an infected mouth, milk from an ulcerated nipple, sweat from a diseased skin, or gonorrhœal matter can transmit the pox.

Neither is the primary venereal disease ever hereditary. Before a part can be infected, it must be deprived of *epidermis* or *epithelium*; it must not be the seat of acute inflammation, and the secretion from it must not be morbid, or so abundant as to serve as a protection.

If, in order to obtain these conditions, we take the purulent matter of a chancre during the ulcerative stage, and insert it with a lancet below the epidermis, on the inside of the thigh, or any other part of the body, the following appearances will be observed.

In twenty-four hours the point where the matter has been introduced becomes red, as after vaccination; on the second or third

day there is slight tumefaction, similar to a small pimple, surrounded with a red areola; on the third or fourth day the epidermis is raised by a liquid more or less consistent, and we observe a vesicle with a black speck on its apex, which is owing to the blood effused when the puncture was made; on the fourth or fifth day the morbid secretion is augmented, it becomes purulent, and there is now a pustule depressed on the summit, which renders it similar to the pustule of small-pox. At this time the areola, which had been increasing both in extent and intensity, frequently begins to diminish, especially if the disease do not advance; but after the fifth day the subjacent tissues, which are often as yet unaffected, or only slightly œdematous, become infiltrated and hardened by the effusion of a plastic lymph, which gives to the touch a feeling of resistance, or that elasticity communicated by certain kinds of cartilage. Lastly, at the end of the sixth day, the matter becomes thick, the pustules shrink, and crusts soon begin to form. If these crusts be not removed, they increase at the base, and become more and more elevated by the secretion of new strata, and assume the form of a truncated cone, depressed at the apex. If the crust be detached, or fall off spontaneously, an ulcer is exposed, resting on the hard base already mentioned. It extends through the entire thickness of the skin, and its surface, which is of a *grayish* colour, consists of a lardaceous and sometimes pultaceous substance, which cannot be removed by washing.

At this stage the sides of the ulcer, neatly cut out, as if by a circular instrument or punch, are nevertheless more or less rough, and present, when examined with a magnifying glass, slight denticulations, and a surface similar to that of the bottom of the ulcer. Their margin is the seat of a degree of swelling and induration, like that of the base, and presents a ring of a reddish-brown colour, which is more prominent than the neighbouring parts, and the borders of the ulcer being thus raised and slightly turned over, it assumes the common infundibuliform appearance of these sores in the early stages.

If the ulcer be destroyed by caustic, or other means, on or before the *fifth* day after the application of the poison, the patient runs no risk of secondary symptoms.

Induration commences about the fifth day, and it is from the indurated chancre that the constitutional symptoms generally arise; for the induration seems to be the announcement that the poison has entered the economy. So long as induration has not taken place, the disease may be considered local. Chancre does not commonly develop itself in the manner described by inoculation. A mucous or sebaceous follicle is the common seat of the disease. Sometimes a mechanical lesion, a sore, an abrasion, or an ulcer is the part affected, or the matter of chancre may be carried into a lymphatic vessel or gland, and there produce the same result. We have thus three varieties :

Pustules at the commencement.

Phlegmon, followed by abscess, and succeeded by a true chancre.

And chancre, or ulceration from the beginning.

Again, when the virus penetrates into a mucous or sebaceous follicle, whose orifice afterwards becomes obliterated, a small tubercular abscess is produced, which afterwards presents all the characters of chancre. The same may take place in the subcutaneous or submucous cellular tissue, if the matter be introduced by the medium of a leech-bite, whose edges, not being inoculated, will afterwards unite. If the matter have passed into a lymphatic vessel or gland, suppuration will likewise occur, and be succeeded by an ulcer of the nature of chancre. But whenever the virus is applied to a denuded surface, there will be ulceration from the commencement.

Masked Chancre or Chancre Larvé.—It has been incontestably proven by M. Ricord that *uterine* chancres, deep *vaginal* chancres, and those situated within the urethra, are as frequent as they were once considered rare. They give rise to *blennorrhagia*, and this virulent kind of *mucous discharge* at first gives rise to symptoms under which the chancre for the most part remains concealed. And he has proven beyond doubt that chancre alone can produce chancre, and that it never can be produced by the mucous or muco-purulent matter of simple gonorrhœa. This fact enables us to detect the incorrectness of the observations of men or women who communicate syphilis to others, yet declare that they themselves labour under gonorrhœa alone. These errors arise from

chancres, which by reason of their location give rise to symptoms of *blennorrhagia*.

Superficial Chancres, by which the skin has not been destroyed through its entire thickness, may or may not be attended with induration, and their borders are more or less raised, according to the depth of the ulceration.

Phagedenic Chancres.—It is the nature of chancre to destroy; but when no complication or untoward predisposition exists, its local progress is soon limited. The limits seem in a certain degree to be fixed by the deposition of fibrin, which constitutes the induration, and is one of the most constant characters of chancre, as was first remarked by John Dê Vigo, and afterwards by Hunter.

Beyond certain limits, the increasing ulceration assumes the name of *phagedenic*, and the different conditions under which this process goes on admits of the following practical distinctions.

1st. *Pultaceous Diphtheral Phagedenic Chancre*.—This variety is analogous in many respects to hospital gangrene. Although in general serpiginous, it also assumes an annular form, rather creeping along the surface than burrowing among the tissues. Skin, mucous membrane, and cellular tissue resist it less than other textures, which often oppose its progress, and this is the reason why its superficial extent for the most part greatly exceeds its depth. The parts in which these sores are situated generally present but little tumefaction; the swelling is œdematous or phlegmonous, and offers none of the characteristic induration. Secondary symptoms bear no proportion either to the extent or duration of these chancres. They have been known to persist for many months, and even more than a year, the ulceration spreading over a surface from six to ten inches in extent, and yet were not followed by constitutional symptoms.

2d. *Phagedenic Chancre from Excess of Induration*.—It frequently appears that an excessive effusion, or kind of apoplexy of plastic lymph, causes the death of the part in which it is deposited. The indurated parts become the seat of a kind of molecular interstitial gangrene, commencing at the surface in the part most distant from the centre of circulation, and afterwards increasing in depth, if the induration be not otherwise dissipated. These ulcers are

generally indolent, unless irritated, and never extend like the other varieties. The induration always circumscribes their progress.

3d. *Gangrenous Phagedenic Chancre*.—The characteristic circumstance in this form is a slough of a gray or black colour. In this case, the cause of the extension of the ulceration is gangrene from excess of inflammation,—a gangrene that differs in no respect from that which is occasioned by ordinary inflammation, and which would not give rise to the admission of a particular variety of chancre, were it not that this mode of extension of ulceration of the chancre is for the most part badly studied, badly understood, and frequently the cause of serious errors. When true gangrene occurs, the chancre is commonly destroyed by the sloughs, and after their removal, a simple ulceration remains, situated on the tissues, which are more or less infiltrated or phlegmonous. If gangrene take place early, it may be considered a good complication, for no characteristic induration remains, and the patient runs no risk of secondary symptoms.

Though we frequently meet with well-marked cases of these varieties, it will, perhaps, be found that they are often combined with one another, and more or less complicated with irritation, sensibility, and pain.

Whatever is the particular form of chancre, let its progress be acute, subacute, or chronic during the period of increase, a cure nevertheless takes place. The cure may be spontaneous, or, as more frequently happens, by the influence of remedies, and that in a space of time difficult to limit, for nothing is more irregular than the duration of this disease. However this may be, the progress of cure announces itself by the passage from the period of ulceration to that of reparation. The bottom of the chancre presents healthy granulations; the borders are no longer swelled, but, sinking down, incline toward the bottom of the sore. The brownish-red and livid tints disappear, giving place to a whitish or pearl-gray circle; while the areola, if it still remain, becomes more and more circumscribed, and finally vanishes. Cicatrization commences at all parts of the circumference, and tends towards the centre; but when the ulceration has been very extensive, it sometimes begins at many points of the centre and circumference simultaneously.

When the ulcer has been situated on the skin or mucous membrane, and these parts have not been destroyed through their entire substance, the cicatrix is on a level with the surrounding parts; when a small portion only has been destroyed, it is more raised; but when the ulceration has occurred in a gland, or the neck of the uterus, which contains no cellular tissue, the cicatrix is depressed. It is not uncommon to observe a partial separation of the borders or bottom of the ulcer, through a third or half of its extent, while the remainder is still in the period of progress; neither is it rare to see ulceration reattack the parts that had begun to heal, from inoculation in the circle of ulceration.

Sometimes the bottom of the ulcer is developed, rises above the diminishing edges of the sore, and presenting a surface more or less granular and convex, constitutes a variety of the *ulcus elevatum*. When the chancre is raised by the base, it constitutes another variety of the *ulcus elevatum*. At other times, true vegetations succeed the fleshy granulations, and constitute the *fungous* or *vegetating chancre*.

Lastly, the chancre may undergo a transformation *in situ*, during the period of reparation, and become a secondary symptom, assume the character of that class of ulcers, or be converted into mucous tubercles or pimples. The edges may remain callous after complete cicatrization has taken place; and this induration, which leaves the cure imperfect, merits the greatest attention.

Diagnosis.—Nothing is more difficult than the diagnosis of chancre. The antecedents, the pretended incubation, the seat, aspect, progress, complications, and the influence of treatment, furnish only equivocal signs. Nevertheless, as regards the regular chancre, the habituated eye will seldom be deceived by the signs that have been described, or by that peculiar kind of induration which, after being once carefully examined, is always recognised. It should be remembered, that the unequivocal, incontestable, pathognomonic signs of chancre, are the effects of inoculation with the matter taken at the period of increase, which effects are always regular and constant, and the production of certain symptoms of constitutional infection, which alone succeed the antecedent.

Prognosis.—In studying the prognosis of chancre, we should consider it first as a local disease, and then as a source of general poisoning, infection, or taint.

The first head embraces the probable duration of the disease, its possible deviations from the normal state, the occurrence of complications, the development of successive symptoms, and the possibility of its being still communicable.

The regular chancre, in a person living properly, and otherwise healthy, constitutes a local disease of small importance. Taken at the commencement, and treated properly, cicatrization may be effected in eight or ten days, and when left to itself, it may undergo spontaneous cure, in from three to five weeks. It always yields to skilful management, without working any serious mischief.

The particular seat of chancre should have great influence on our prognosis, as regards its probable duration. Thus a chancre situated on the *frenum*, which is easily perforated; a chancre in the *urethra*, constantly bathed by the urine, and a chancre on the anus, irritated by the stretching of the parts when at stool, and soiled by the *fæces*, although uncomplicated, *cæteris paribus*, takes a longer time to heal. In like manner, chancres of the neighbouring parts, which we are obliged to keep covered, and those situated in parts liable, from their functions, to undergo changes of volume, are long in healing.

However regular chancre may be at its commencement, we should dread the occurrence of complications and deviations, whenever any of the causes already specified are present. It does not follow that the disease will be slight, because it was trivial in the person by whom it was communicated. Some of the most troublesome cases to manage, may be contracted from persons having the disease very slightly.

With regard to successive affections, we must take into account the disposition of the parts affected, and the particular seat of the ulceration. By successive affections are meant those which are only a gradual continuation of the same malady, such as the production of new chancres, the development of sympathetic buboes from extension of the inflammation, and the occurrence of symptomatic buboes, arising from the transport of the venereal virus.

Whenever the virus is retained in the parts, or touches points susceptible of inoculation, we should dread the formation of successive chancres. Of this kind are chancres of the anus, succeeding those of the fourchette in the female: in some cases, chancres commence at the posterior extremity of the raphé, which becoming swelled, assume the appearance of condylomatous excrescences, and may be mistaken by the unaccustomed eye for hemorrhoidal tumours.

Whenever a wound or other solution of continuity is situated in the vicinity of a chancre, we should dread inoculation.

Important difference exists in the prognosis of the varieties of chancre, resulting from certain complications or conditions, which make it deviate from its normal progress.

When a chancre has assumed the phagedenic form, its duration ought to be much longer: it is a cause of deformity by destroying the tissues in which it is situated, and may give rise to hemorrhages, by attacking important vessels. Urethral, anal, and vulvar fistulæ, are some of the serious disasters which ensue.

The *diphtheritic phagedenic chancre*, considered as a local affection, is the most troublesome variety, because we can neither foresee the length of its duration, nor the extent of the ravages it will commit. Next to this form, is the *gangrenous phagedenic chancre*, from excess of inflammation, in which case we must always fear the extensive destruction of the tissue affected. Its duration is short, as in ordinary gangrene, which advances with great rapidity. Lastly *indurated chancre*, the final cure of which is generally tedious, is *cæteris paribus*, much less serious than the preceding, both as regards possible local alterations, and the extent to which it may proceed.

But the question most frequently asked refers to *bubo*; for it rarely happens that a person affected with chancre does not interrogate you as to the risk he runs in this respect. The particular locality of the primary sore exercises the greatest influence on the production of bubo: according to M. Ricord, out of a hundred cases of bubo, more than eighty are preceded by chancre of the *frenum*, or inferior part of the glans or prepuce, in the male, and in the vicinity of the urethra in the female. He says, "A small chancre

in the neighbourhood of the frenum, in the vicinity of which the tissues are little affected, acts much more efficaciously as a cause of bubo than a more extensive sore in another part. Thus, bubo has never supervened from the numerous inoculations we have made, whatever was the progress of the pustule, or of the chancre by which it was succeeded. The extreme readiness with which absorption takes place in the neighbourhood of the *frenum*, requires a more minute study of the extremities of the lymphatic vessels, which may perhaps explain the primary production of certain buboes."

So long as the chancre is in the ulcerative stage, it is impossible to predict its termination with exactness. A speedy cure cannot be promised until the period of reparation commences, and the process is going on with regularity.

Syphilis is the source of the most frightful calamities to which the human race is exposed, and the possibility of its transmission is a question so delicate, and so frequently proposed, as to merit the greatest attention.

Whenever an ulcer, therefore, be its aspect what it may, has been contracted in the way chancres are contracted, let no argument be wanting to prevent the exposure of a healthy female to the contagion, and do not affirm, because such and such is its seat, that there is no risk of infection, and cause an individual with an ulcerated bubo to transmit the evil of which he thought himself free.

It rarely happens that secondary symptoms show themselves before the second week; but they generally occur after the sixth week, or at a much later period. The form of a chancre, from which constitutional syphilis can be predicted, is that accompanied by the characteristic induration, the true Hunterian chancre; and it is affirmed that the frequency of general infection is in direct ratio to the extent of the induration.

Secondary symptoms, although they sometimes manifest themselves while the primary sore is still present, rarely occur during the period of increase,—at least when the increase of ulceration is not due to excess of induration. They generally occur during the period of reparation, or rather after cicatrization has taken place;

this more especially if a nucleus of induration occupy the place of the chancre.

Indurated chancre is the principal source of constitutional syphilis. Next to this is the phagedenic chancre, which, however, may be of considerable extent and duration, without giving rise to general disease. The least dangerous of all, in this respect, is the gangrenous phagedenic chancre, from excess of inflammation.

The number of primary symptoms, with their complications, except *induration*, do not aid us in forming a prognosis; and bubo, in the majority of cases, is far from proving that the disease has become general. Bubo, as already remarked, is frequently sympathetic, or distinct from syphilis. When it is virulent or symptomatic, it constitutes a disease identical with chancre, whose consequences are neither more nor less troublesome than if the patient, instead of having but one, has actually two primary sores.

All persons are not equally susceptible of general syphilitic disease. It is probable that certain idiosyncrasies can resist consecutive poisoning.

According to M. Ricord: "Certain conditions are necessary, in order to the development of general symptoms, which, although they often escape notice, we are frequently able to detect. If we reflect on the ages of our patients, we are struck with the facility with which constitutional syphilis develops itself in children, especially through the medium of *hereditary taint*, and, on the other hand, how much less frequent it is in old persons after a recent infection. The sexes present differences which have not always been well explained, secondary symptoms being much less frequently observed in women than in men."

Treatment of Primary Syphilis.—Ample experience has shown that unindurated chancre yields more rapidly to local than to general mercurial treatment. But indurated chancre, it is generally maintained, disappears sooner under the influence of mercury than simple local means, and as rapidity of cure is an object, we should have recourse to that agent or remedy which soonest accomplishes the end. The indication for the omission of the mercury, is the removal of the induration which prevents or retards the healing of the sore. The indication no longer exists when this induration is

so far removed as to cease to be an impediment to the salutary operation of local means, or when the mercury has commenced to exert a baneful influence upon the constitution, as evidenced by inflammation of the salivary glands, soreness of the mouth, &c.

Mercury is only peculiarly applicable to the cure of indurated chancre, and its exhibition should cease when the sore is susceptible of the influence of simple local remedies.

But it should be remembered that hardness persists for years, or even for life, and may be as often removed by the application of escharotics, as the nitrate of silver, sulphate of copper, and caustic potassa, as by mercury.

Chancre, at its commencement, imperatively requires to be treated by the *abortive, or eradicating method*. This is an important precept, for there are no well-attested cases in which ulcers, destroyed within five days after infection, have been the cause of secondary symptoms.

Hunter was decidedly of opinion, that the progress of chancre should be promptly arrested, and gave the preference to *cauterization* when the sore was situated upon the *glans*, and *excision* when its seat was the skin.

Pustule at the commencement.—This form, which is the most rare, when the disease is contracted in the usual way, may be easily confounded, during the early stages, with *herpes*, or *eczema*. It generally yields to a single cauterization with nitrate of silver, if early applied. Cauterization of the pustule is denominated, by M. Ratier, the *ectrotic method*. Lint, wet with a solution of sulphate of copper, two or three grains to the ounce of water, should then be applied to the chancre. It should be a rule to open and freely cauterize every pustule which appears on the exposed parts, during the first days succeeding suspected intercourse. This practice should be pursued, whatever may be the nature of the pustule, and without waiting to make a rigorous diagnosis, for there is no harm if the pustule should only be a vesicle of *herpes*, or *eczema*. The *nitrate of silver* is preferable in the first stage of this form of chancre. The stick ought to be pointed, so as to reach the bottom of the pustule.

Whenever a doubtful pustule is situated on a movable part, and

can be isolated readily, excision may be practised. If the healthy tissue be divided, it leaves a surface which cicatrizes with great rapidity. The excision can be readily made by curved scissors.

Ulceration, or Chancre from the commencement.—This form, which, on account of the ordinary condition of the parts affected, and the facility with which the pustule bursts so soon as it is formed, is the most common of all. It is to be treated like the former. As every doubtful pustule should be cauterized or excised, so every doubtful ulceration should undergo the same treatment.

Whenever a part has been exposed to the contagion of chancre, and enlargement of one or more follicles succeeds, the part should unhesitatingly be cauterized with the nitrate of silver. If follicular abscess exist, and the disease be still limited, the same treatment should be adopted; but if the disease have gone any length, the abscess should be opened, and the part deeply cauterized.

When the disease is situated in a lymphatic vessel or gland, this treatment is no longer applicable, but recourse must be had to the means employed for the destruction of bubo. The manner of treating the lymphatic or glandular chancre consists in blistering the tumour, the blister always covering the part affected. When the blister has produced the desired effect, and the raised epidermis is removed, the denuded surface should be covered with a pledget of lint soaked in a solution of the deutochloride of mercury, with five grains of the salt to the ounce of water; the pledget should remain applied for three hours. This caustic solution is not equally borne by all patients; some not being able to endure the acute pain it excites for more than one hour. This is the method of M. Malapert. Instead of the solution of mercury, analogous preparations may be employed, such as a solution of two or three drachms of the sulphate of copper to the ounce of distilled water. An eschar must be produced, in order to obtain the desired effect; but the eschar should not extend through the entire thickness of the skin. When the eschar is formed, it should be covered with an anodyne cataplasm during the first day, for which should be substituted, on the following morning, a compress wetted with a weak solution of subacetate of lead, and retained until the slough

separates. When this has taken place, the simple ulceration that remains should be covered with lint, spread with simple ointment: it is not advantageous to encourage suppuration, when the object is to cut short the disease. If the bubo resist the means employed, and symptoms of acute inflammation do not appear, the treatment must be persevered in, and the blister and caustic solution repeated.

M. Ricord observes, "Whatever be the time of the duration of a chancre, and whatever the form under which it has appeared, we must endeavour to destroy the chancre as quickly as possible, if its seat and limits permit. This precept, the truth of which is strengthened by daily observation, cannot be too often repeated. Of those affected with constitutional syphilis who have come under my observation, in none had the chancre existed for less than ten, twelve, or fifteen days; and in the great majority of cases, the primary symptoms had remained for three, four, five, six, or a greater number of weeks.

"If the tissues in which the chancre is situated have become infiltrated, or if the chancre itself have acquired a certain size, the nitrate of silver will not act to a sufficient depth; and if we practise excision, there is a risk of cutting into parts already the seat of disease. Having observed that gangrene, when it attacks a chancre, reduces it to the state of simple ulceration, I have obtained the most happy results from the use of caustic potash, and the *pâte de Vienne* (made by mixing five parts of quicklime with six of caustic potash, and working them into a paste with alcohol). I prefer the latter escharotic, but it should be employed with caution, in order that its effects may extend one or two lines only beyond the actual disease. It must likewise be remarked, that as considerable œdema frequently results from this method of treatment, it ought not to be adopted when the chancre is situated on the inner surface of the prepuce, or on the *glans penis*, where there is any degree of phimosis; but excepting in this case, it is a practice not to be neglected."

A syphilitic ulcer should not be too frequently dressed whilst the process of cicatrization is going on; but during the stage of increase, it should be frequently dressed; for the matter secreted

by the sore becomes a cause of the disease, and, therefore, should not be permitted to remain, but ought to be washed two or three times a day with Castile soap and water.

After cauterization with the nitrate of silver, the chancre should be dressed with lint saturated in a solution of sulphate of copper, or acetate of zinc, from two to four grains to the ounce of water; a solution of creasote, two to five drops to the ounce of water; a mixture of the solution of chloride of soda, one or two drachms to an ounce of water; black wash, or vinum aromaticum; this last is preferred by M. Ricord, and highly recommended by him. There is nothing better than the sulphate of copper, two grains to the ounce of water.

These applications diminish the purulent secretions, and favour cicatrization: if there be much pain, solutions of opium, or morphia, may be added to them. Care should be taken to apply the lint in such a manner as to separate the prepuce, or folds of the skin, from the surface of the ulcer, as well as to prevent ulcerated surfaces coming in contact with sound parts; the lint should not be kept too wet.

Care must be taken, in cutaneous chancre, that they do not become covered with scabs, or crusts, under which the matter may burrow. It may sometimes be necessary to apply an emollient poultice, in order to clean the ulcer. Cauterization with the nitrate of silver should be repeated every day or two, so long as the ulcerative stage continues. When reparation commences, the healthy parts of the ulcer must be avoided, and its application continued to the parts that retain a specific character; as well as for the destruction of exuberant granulations.

In a case of regular uncomplicated chancre, local treatment will suffice, provided no induration remains.

Masked Chancre.—When the chancre is situated in the urethra, and accompanied by symptoms of acute gonorrhœa, antiphlogistic measures must be had recourse to; as leeches to the perineum and penis, local emollient baths, general bathing, opiate applications, diluents, &c. Erections should be prevented by the means recommended for chordee.

If small abscesses form at the orifice of the urethra, they should

be opened early, and when all inflammatory symptoms disappear, the solutions recommended for external chancre may be diluted with a decoction of poppy-heads, and used as injections. When the symptoms of gonorrhœa are not too intense, the urethral ulceration may be cauterized with the nitrate of silver, from the commencement, by the aid of M. Lallemand's instrument, or the cut bougie and sponge recommended in gonorrhœa.

Where the chancre is situated at the entrance of the urethra, so as to be visible, the same treatment is applicable as to external ulcers.

When the gonorrhœal symptoms depend upon the urethral chancre, they cease as soon as the sore is healed; but if they constitute an independent concomitant affection, they require the usual treatment for gonorrhœa.

In cases where the deep parts of the vagina, the neck or cavity of the uterus, are the seat of chancre, the speculum should be employed at each dressing. When the sore is situated on the anus, or at the inferior part of the rectum, great cleanliness should be observed, the bowels kept soft, and the dressings renewed after each stool.

Superficial Chancre.—In the majority of cases, these chancres do not present any particular indication.

A single application of the nitrate of silver, and the interposition of fine lint between the glands and prepuce, generally suffices for their cure. Should they persist, the treatment before recommended should be adopted.

Phagedenic Chancre.—When the frenum is destroyed, a fistulous opening made, or bridges formed by the peculiar way in which the soft parts are sometimes acted on by this kind of chancre, the ulcerated surfaces must be excised, for adhesion is prevented by their remaining in contact. When the frenum is perforated, the cure is much accelerated by detaching it with curved scissors, and cauterising it freely.

Phagedenic Chancre, pultaceous, diphtheritic.—M. Ricord speaks of this form of chancre in the following manner. "It is necessary that the conditions which give rise to this form of chancre should be studied with great care. It frequently happens

that the patient dwells in a cold, damp, unhealthy situation, and we find that when he changes his place of residence, the disease undergoes improvement. Thus, if he remove from a warm to a cold climate, it often undergoes a frightful change, while in opposite circumstances it frequently goes on to a happy termination. This will perhaps explain, how certain effects are obtained by removing the patient from one hospital to another, or by transferring him to a town in the south, more salubriously situated than the one he previously inhabited."

In this variety of chancre there is some concomitant visceral affection, under the influence of which the disease is apparently developed. This concomitant disease for the most part consists in a depraved condition of the *primæ viæ*, which either maintains or favours the disease, and it is our chief duty to obviate the operation of this cause, for if it persist, or be aggravated by bad treatment, we cannot hope to cure the syphilitic ulcer, whose particular form it has determined.

In fulfilling all the therapeutical indications which the different pathological states accompanying and complicating the chancre may present, we must beware of attributing the troublesome and rapid progress of this variety to a peculiarity in the nature of the specific cause, or a particular intensity of the venereal virus. This is a common error, and is the source of much evil. The practitioners who adhere to the old doctrine run to their specific, and administer mercury in quantities proportionate to the strength of the poison they wish to counteract.

It should be remembered that the essence of syphilitic disease, like that of small-pox, is always identical, (the differences they exhibit being dependent on individual conditions,) and our best efforts should be employed to combat them with rational means.

With few exceptions, nothing can be more injurious than the use of mercury, in any way, in this form of chancre; and the more so if, instead of induration, it be accompanied by nervous irritability and inflammatory symptoms. It is not uncommon to see these ulcerations throw out troublesome granulations, when on the point of passing into the state of reparation; and chancres

which were limited become phagedenic under the baneful influence of mercury.

Whether the variety of sore now under discussion originates from a chancre on the skin, a chancre on the mucous membrane, or from a virulent bubo, the treatment most frequently and rapidly successful consists in the combined use of caustic and the solution of sulphate of copper or creasote, or, according to Ricord, of the *vinum aromaticum*. The cauterization should be frequent and deep, so as to follow the ulceration in its progress, and the dressing with the aromatic and other lotions should be repeated according to the abundance of the secretion. In some patients the disease can only be removed by an almost perpetual washing of the sore. Care must be taken not to rub or fret the edges of the ulceration on removing the dressing; for each excoriation becomes a point of inoculation, and whenever the skin is raised, a new surface is presented for the absorption of the venereal virus, and consequent extension of the evil. It has been recommended to apply leeches to the chancre when the local inflammation is vivid; but the soundness of the practice is extremely doubtful, and is far from being so beneficial as some practitioners have described. Independent of the difficulty of making the leeches fasten on the ulcerated surface, the disease extends to the depth of the wound made by them; while, on the other hand, if they be applied to the parts surrounding the sore, each bite is exposed to the contact of the poison, and may become the centre of a new ulceration. When the local inflammation renders bloodletting necessary, the leeches should be applied at a distance from the sore, the bites being afterwards protected by a compress wet with a solution of acetate of zinc, until cicatrization is completed. In the inflammatory complication, the best results are obtained by regulating the diet, rest, the use of diluents, tepid bathing, and the application of emollient or narcotic decoctions and soothing cataplasms to the part.

When the chancre is accompanied by much irritability or pain, to the presence of which inflammation is not essential, we must prescribe both the general and local use of opiates. The sore may be dressed with the following preparation, if inflammation be present: *R.*—*Aq. lactucæ distil.*, ʒviij; *ext. gum opii*, 3j; *M.* If there

be no inflammation, it will be found advantageous to combine the opium with wine.

M. Ricord very truly remarks, that "cauterization with the nitrate of silver is a remedy not to be neglected, and no error in doctrine should prevent its application, because pain and inflammation are present; for, when properly applied, it generally proves the best sedative and most certain antiphlogistic. Proofs of this fact are exhibited daily in the wards of the venereal hospital, where it is common to hear the patients themselves demand the application of the caustic. The acute pain exhibited at the moment soon subsides, and is succeeded by a degree of comfort which we vainly look for from other remedies. In a few cases, it is necessary to abandon these means for a time, and to make use of unguents, particularly the opiate cerate."

The phagedenic chancre sometimes makes no progress towards a cure, but either continues to advance, or remains stationary. In these obstinate cases, where we cannot destroy the evil, we sometimes succeed by making use of carrot poultices, or the application of melted wax or digestive ointments. Powerful caustics, such as the chloride of zine, potassa, and the actual cautery, have been tried. The employment of pure caustic potassa, or the *pâte de Vienne* is usually successful, and, as means much less violent, blistering ointment, and the powder of cantharides.

Whenever the treatment above described proves abortive, we must change our method. If the ulceration be shallow, apply a blister, or sprinkle over it powder of cantharides; if it be deep, if it have succeeded a virulent bubo, and if the raised integument be still sufficiently thick, have recourse likewise to the blister, and at the same time introduce the powdered cantharides into the suppurating cavity. This dressing should remain applied for twenty-four hours, when the treatment of ordinary chancre is to be resumed. The ulceration soon becomes clean under this management; healthy granulations appear, the cavity (if such existed) rapidly fills up, and the separated integument unites. In some patients it is necessary to repeat this treatment, reapplying the blister when it has not fulfilled the end required; or, when the surface of the

ulcer is dry, repeat the application of the powder of cantharides every three or four days, until fleshy granulations appear.

It frequently happens that the edges of the phagedenic chancre are so small and thin, that it is a waste of time to attempt to induce adhesion ; it is the best practice, in this case, to destroy the altered tissues. In order that we may act with promptitude and vigour, it is necessary to establish certain distinctions. In some cases of ulceration succeeding abscess, there is extensive separation and thinning of the skin, from the previous lodgment of matter, without the chancre assuming the phagedenic form ; while in other cases it undergoes this deviation. When the phagedenic form has not occurred, the diseased integument may be excised. When the ulceration continues to extend phagedenically, nothing is more injurious than the use of cutting instruments ; for instead of limiting the evil, they aggravate and extend it, unless followed by cauterization of the bleeding points. It is better in this case to trust to cauterization alone, especially to the pure potassa, or *pâte de Vienne*. In addition to the facility and the neatness with which the diseased parts may be removed by this caustic, there is a good chance of completely destroying the virulent surface, or at least of preventing the new borders of the sore from being quickly inoculated, by the interposition of an eschar. A vital reaction likewise is produced, the absence of which, in some cases, is the chief cause of the continuance of the ulceration.

M. Ricord asks and answers the following question, thus :—

“After what has been said, is it necessary in every case to shun the use of mercury, and other medicines reputed anti-syphilitics ?

“If it be true that, in the great majority of these cases, mercury, sudorifics, &c., are hurtful, it is no less true that, in certain circumstances, these alone have been of use ; and this fact has been frequently proven by the practice of the men who avow the greatest aversion to the use of mercury.

But is it possible, in the present state of the science, to point out the circumstances which render mercury useful, or even indispensable ?

I am ignorant of them, and I abandon myself to a rational empiricism. Thus, if the disease go on, in spite of the means pointed

out above, I have recourse to the treatment so long regarded as specific. I make use of mercury; first as a local application, and afterwards as a general agent, introducing it into the mouth or skin, according to the circumstances to be mentioned hereafter. The local application, the general administration of the mineral, or both together, are continued according to the amelioration which takes place; while, on the other hand, both must be suspended if the disease increase during their employment. In the case where, according to the old doctrines, it is thought necessary to commence with mercury, which I do not advise, it is wise to suspend the mercurial treatment as soon as adverse symptoms appear.

“With regard to other remedies styled anti-syphilitic, some may be employed when we wish to exhibit a general tonic, or to stimulate the digestive tube, the urinary organs, skin, &c. Soothing applications, with local and general antiphlogistics, will be frequently indicated, but useful in his hands only, who, free from prejudice, knows how to use them properly.”

Indurated Chancre.—Induration is an essential character of the Hunterian chancre. Induration is a source of danger, and may persist after cicatrization is complete; it most frequently has a tendency to increase, and not only opposes the healing process, but causes the sore to assume the phagedenic form, by determining the peculiar gangrene before described.

Indurated chancre is seldom complicated with pain or inflammation, and the object of the treatment is to remove the induration, and guard against constitutional symptoms.

The common indurated chancre should be dressed two or three times a day, with lint spread with an ointment consisting of six grains of calomel, and two drachms of opiate ointment; if the supuration be copious, this dressing should be preceded by the use of the lotions recommended for ordinary chancre; or touch the chancre freely with caustic potassa, apply a poultice, and, after the slough separates, employ the stimulating lotions. In cases where the disease is attended by inflammation and nervous irritability, and interstitial gangrene makes progress, the preference should be given to a concentrated solution of opium, as a local means of cure,

and this dressing continued until the sore is reduced to a simple state, by the combination of emollient and antiphlogistic treatment.

Nitrate of silver may be used to modify the surface of the ulcer, to arrest the progress of gangrene, and to repress the fleshy granulations, which, in this form of chancre, have sometimes a tendency to become vegetating and fungoid.

If mercury be hurtful in other forms of chancre, it is highly advantageous in this, where the excess of induration tends to the production of the phagedenic form of the disease. M. Ricord very wisely says: "Without agitating the question to what class of medicines should mercury be referred, it is certain, that among the effects it produces on the economy, there are some which cannot be disputed, and are acknowledged by the upholders of the most opposite doctrines. These effects are pathological modifications and curative results. It is an error to suppose that the dose of mercury is the same for every subject, for there are some who resist its action up to a certain point. There are some persons on whom mercury has no effect, others who are injured by it, and not a few who are cured by its exhibition; but this latter fact has not always been acknowledged, and hence the proceedings, which, in these latter times, have frequently been taken against this powerful medicine.

"In order that mercury may produce all we have a right to expect from it, it must be administered in doses proportioned to the individual treated. The proper quantity for each patient will be discovered, by beginning with a small quantity, increasing the dose until a favourable change is produced in the lesion we are treating, or until adverse symptoms warn us to stop. The increase of quantity, so necessary in many cases, has appeared to me to be more efficacious when a sudden change is made from a small to a large dose,—five or six days being allowed to intervene between each increase,—than when the alteration is daily, and by insensible gradations. From what has been said, the impossibility of limiting the daily quantity of the medicine in every case will be apparent, for the greatest individual differences exist. Further, we are to calculate more on the action of each dose, than on the total quantity taken; for the person who takes a large quantity of mercury,

in divided doses and during a long time, will be less mercurialized than one who takes in a short space, a less quantity in daily doses better proportioned to his constitution.

“With regard to the symptoms which should make us limit the dose, suspend the medicine, or altogether renounce its use, they should be reduced to their proper value. Its action on the mouth is now generally considered as much an inconvenience as it was formerly hailed as a favourable event. Mercurial *stomatitis* (ptyalism, mercurial salivation) should be regarded as one of the worst effects of mercury. If in some cases, the venereal symptoms improve during its presence, they are more frequently aggravated. This is especially the case when the buccal cavity is the seat of syphilitic disease; and when matters do not become worse, the disease is stationary during the continuance of salivation.

“If it is certain, then, that salivation rather tends to suspend than to promote improvement, that it constitutes a disease of itself, if not serious, at least painful and tedious: we should carefully guard against its occurrence, by ceasing to augment the dose of mercury whenever the mouth begins to be affected. The medicine should be suspended if *stomatitis* is developed, and the symptoms allowed to fade before we resume its employment. On resuming the use of mercury, the quantity should be much smaller at first, augmenting it afterwards; for we frequently find, that in this way a greater quantity may be given without ptyalism being produced.

“Sensibility of the mouth being commonly the first indication of the patient being constitutionally affected with mercury, and an event which guides us in determining the dose of the drug, it is a circumstance which must be examined with great care, in order that we may not be led into error by the presence of other accidental affections of the mouth. Every time we commence the treatment, we should be well acquainted with the state of the cavity, and should take into consideration the unhealthy dispositions which may rapidly determine the action of the remedy.

“Next to *stomatitis*, derangement of the stomach and bowels is the most frequent bad effect of mercurial treatment: here likewise, by inquiring into the previous conditions of the patient, we can act according to the rules just laid down regarding the diminution or

suspension of mercurial treatment. We should act in the same way in the rare cases of mercurial eczema, when it is not a direct consequence of friction, and likewise in every bad symptom at all referable to mercury, such as wandering pains, tremors, &c. In a word, every morbid symptom not belonging to syphilis, developed during the use of mercury, and augmented by its continuance, ought to determine us in limiting the dose, or suspending its employment. But the curative results are better guides than the bad effects of the remedy; and when a symptom is improving under a particular dose, the quantity should not be altered till the improvement ceases.

“Although I prefer the proto-ioduret, it must be observed, that in some cases the form of mercury should be changed, when that first chosen is inefficacious or productive of inconvenience.”

Gangrenous phagedenic chancre from excess of inflammation.—The inflammation in this form of chancre, should constitute the chief object of attention, losing sight of the original cause of the evil for a time. The rash and empirical use of mercury, in cases where it is contra-indicated, does great evil. If gangrene supervene, it should be regarded as a simple case, uncomplicated with syphilis, and treated accordingly.

When these untoward events have disappeared, and the chancre is left in one of the conditions already specified, which is generally a simple sore, cicatrization will be produced by the ordinary local means.

Constitutional Syphilis consists of secondary and tertiary symptoms.

SECONDARY SYPHILIS.

The symptoms of secondary syphilis generally appear from two to six weeks after the primary attack; but sometimes a longer period elapses.

Diagnosis.—For some time before the appearance of the symptoms, the patient is generally thin, dispirited, eyes heavy, he

complains of want of appetite and sleep, and suffers from rheumatic pains.

Those which follow speedily after the primary affection, commonly during the second month, consist chiefly of *general eruption*, and *affection of the throat*; ushered in by febrile excitement, and usually by more or less change in the complexion, dryness of the hair, rheumatic pains in the extremities of the long bones, and violent nervous headache, particularly apt to be seated in the forehead.

Exanthematous roseola, often follows the simple sore at an early period. Not unfrequently it precedes the appearance of other forms of eruption, seeming to be the basis on which they subsequently form.

Syphilitic eruptions vary in degree from the slightest discoloration to the most inveterate ulcers. In the mildest form, the skin is mottled and stained in irregular patches of a brownish-red colour, which are caused by a slight swelling and vascular injection. A greater degree of the same derangement will produce *syphilitic psoriasis*, in which the skin is raised in copper-coloured blotches, covered with scabs of hypertrophied cuticle. Or there may be an eruption of *papulæ*, or pimples, varying in size from a pin's head to a pea. These eruptions are succeeded by scabs, or exfoliations of the cuticle.

Scaly Eruption, Lepra Syphilitica, is an aggravated variety of the preceding. It begins with an eruption of copper-coloured blotches, which become covered with scales of enlarged cuticle; these are succeeded by scabs, and when they fall off, disclose shallow ulcers with copper-coloured edges.

Vesicular Eruption, Rupia.—Consists in large flattened bullæ, filled with serum, which gradually become purulent, and finally dry into scabs, under which the skin is ulcerated. The ulcers spread under the scabs, and the latter become remarkably thick from successive additions.

Pustular Eruption, Ecthyma.—This consists of large prominent pustules, with a copper-coloured base, leading to ulcers.

Tubercular Eruption.—Red inflammatory tubercles, form most frequently at the alæ of the nose, or on the cheeks. They

gradually pustulate, and are succeeded by deep irregular ulcers, terminating in puckered cicatrices.

Condylomata.—These are soft red fungous elevations of the surface of the skin, generally situated about the anus, or between the scrotum and thigh, or at other parts where two cutaneous surfaces are in contact. They are covered with a thin cuticle, and often exude a copious thin discharge, which is thought to be occasionally contagious. They generally occur with psoriasis or lepra.

Frequently the hair loosens and comes away, threatening baldness. Iritis not unfrequently occurs as a secondary symptom, and may follow any form of syphilitic sore; it is most frequently found associated with a papular eruption. Sometimes periostitis shows itself in one or both tibiæ. The throat is variously affected; by inflammatory process, aphthæ, or ulcer.

Syphilitic Sore Throat.—The mildest variety is a superficial excoriation of the mucous membrane of the tonsils, or some other part of the mouth or fauces, corresponding to psoriasis on the skin. The parts affected are swollen and sore; sometimes red and raw, and sometimes covered with a whitish secretion. This state may be succeeded by a superficial ulceration.

The *excavated ulcer* of the throat looks as if a piece had been scooped out of the tonsil. Its surface is foul and yellow, its edges raised, ragged, and swelled. There is but little inconvenience from it, and very little constitutional affection, unless it be attended with eruption on the skin.

The *sloughing ulcer* commences in a small aphthous spot, which rapidly ulcerates, and is attended with great pain and fever. The surface of the ulcer is covered with an ashy slough, and the surrounding mucous membrane is dark, livid, and swollen. The lingual artery may possibly be opened by the extension of the ulceration, and the patient die of hemorrhage, unless the common carotid be tied.

There is often difficulty thrown in the way of correct diagnosis, in secondary syphilis, by the denial of the patients that they have ever had primary symptoms. If, however, the patient have a copper-coloured eruption, a sore throat, falling of the hair, and a general

faded, unhealthy look, and these disorders are of recent date, an cannot be attributed to any causes connected with diet or residence, the probability is that they are syphilitic.

Treatment.—If the venereal eruption and sore throat be ushered in with pain in the chest, and other febrile or inflammatory symptoms, it will be necessary to give aperients, and saline medicines with antimony, to restrict the diet, and confine the patient to the house. The warm bath will also be found useful.

In the papular form of eruption, and in most cases of pustular eruptions, mercury is seldom necessary; but, in the tubercular form, it is inexpedient.

Antimony, sarsaparilla, guaiac, and the iodide of potassium, are powerful enough alteratives or eutrophics, and eliminators; these, with attention to the general health, suffice for the cure.

In the scaly form, mercury may always be given, yet with caution; never pushed to extreme ptyalism, and always withheld, at least for a time, on amendment having begun.

In the constitutional symptoms following the sloughing sore, the phagedenic sore, or the sloughing phagedena, mercury should be abstained from; experience having proven that it tends to ultimate aggravation.

The object of treatment is not to repress the eruption in its first onset, but, on the contrary, its full appearance is solicited; obstinate persistence, and repeated recurrence, however, should be overcome as soon as possible. And the object of the constitutional treatment is simply to assist nature in a full, early, and complete elimination of the poison, by acting on the skin, kidneys, bowels, and other organs of excretion.

The throat should be steamed, fomented, touched with nitrate of silver, and blistered externally; according as it is the seat of active congestion, inflammation, ulcer, chronic inflammatory action, or passive congestion.

Iritis has its own appropriate treatment.

Approaching baldness is anticipated, by shaving the head; it is well to keep it closely shaven, long after the other signs of constitutional disorder have wholly disappeared.

Sarsaparilla, when good, is a remedy that may almost always be used with advantage in secondary syphilis. It may be com-

bined with corrosive sublimate, or the iodide of potassium, or may be administered after a course of these remedies, to restore the flesh and strength. The mineral acids, especially the nitric; sedatives, hyoscyamus, conium, and tonics will all be of service in protracted cases. It is generally necessary to change and vary the remedies repeatedly in this disease.

Local Treatment.—For syphilitic eruptions, the warm, vapour, and sulphur baths will often be advisable. Obstinate patches of lepra or pimples may sometimes have their removal hastened by applications of diluted citrine ointment, or white precipitate ointment. Itching eruptions may be relieved by a weak lotion of corrosive sublimate. Ulcers must be treated according to the condition in which they are found, whether inflamed, irritable, or indolent. As a general rule, weak mercurial applications, black wash, or weak red precipitate ointment, answer best.

For the common excoriated sore throat, a soothing detergent gargle should be used. When the throat is ulcerated, it is advisable to use gargles of corrosive sublimate; if the ulcers be indolent, they may be touched with dilute tincture of iodine, a strong solution of nitrate of silver, or with the solid stick. *Mercurial fumigation* is sometimes beneficial; it may readily be performed by placing a scruple of red sulphuret of mercury on a heated iron, throwing round it a cloth in the form of a funnel, and inhaling the vapour.

Ulceration of the Larynx is occasionally benefited by fumigation; but mercury, to the extent of affecting the mouth, is almost always injurious in these cases, as it is in other cases of rapid ulceration. Sarsaparilla, sedatives, blisters to the throat, and occasional leechings, are the necessary measures to be employed.

Secondary syphilis is transmissible from one or both parents to their offspring; the blood being tainted with the virus, and the virus being communicated through the medium of tainted secretion.

Syphilitic taint sometimes causes the death of the infant about the fourth or fifth month, and the woman to miscarry repeatedly. Sometimes a child is born shrivelled and weakly, with hoarse voice, discharge from the nostrils, and with copper-coloured

blotches or ulcers, especially about the anus and pudenda; or it may be born healthy, and these symptoms appear a month afterwards. A child may also be affected with primary syphilis by inoculation from the parts of the mother. The best plan of treatment for children affected with constitutional symptoms, is to rub ten grains of mercurial ointment daily into the axilla, or soles of the feet, till the symptoms disappear.

TERTIARY SYPHILIS is not transmissible. Tertiary symptoms are seldom urgent from the result of venereal poison alone. It is only when this has been associated in the system with mercurial poison, that severity is met with.

Diagnosis.—In the milder cases the bones and periosteum are affected by a chronic inflammatory process, those suffering most which are most exposed, as the *tibia*, *ulna*, *os frontis*, and *nasal bones*. It commences with tenderness of the affected bone, severe pain, which begins in the evening, and lasts almost all night, and is absent generally during the day. Pain is soon accompanied with oblong swellings or *nodes*, arising from infiltration of the periosteum with lymph and serum, a quantity of serum or fibrin being effused between the periosteum and bone, producing a fluctuating tumour. If the disease advance, the bone, which is already swollen, becomes carious; matter forms between it and the periosteum; extensive exfoliations ensue; the patient suffers severely from the pain and discharge, and if the disease be seated on the head, where it is called *corona veneris*, death may ensue from the irritation of the dura mater, or protrusion of the brain through apertures in the skull. Such cases are at present rare, but were much more common when mercury was supposed to be the only means of cure in this disease.

The affection of the nose generally begins with a sense of heat, dryness, and snuffling. The mucous membrane ulcerates, the periosteum is denuded, and exfoliation of the bone follows, with profuse fetid discharge and odious deformity.

Sometimes the skeleton is affected symmetrically, corresponding bones suffering at corresponding points. In other instances one side is free, while scarcely a bone of the opposite side of the skeleton escapes being more or less affected. The joints are liable to pain,

stiffness, and chronic enlargement, similar to chronic rheumatic affections of these parts. The skin is liable to be attacked by tubercular formations, which assume the character of rupia prominens, and degenerate into foul irritable sores. The initiative may be vesicular formation. Sometimes the sore is formed at once by sloughing, followed by acute ulceration.

The mucous membrane of the alimentary canal is liable to suffer at either extremity, but especially in the fauces. Ulceration of the larynx is mostly caused by an extension of ulceration from the palate. It is characterized by tenderness, huskiness of voice, which frequently degenerates into a mere whisper, suffocative cough, and expectoration of bloody purulent matter; there is also great loss of strength and flesh, and life is sometimes terminated by suffocation. The anus may be the seat of aphthous ulceration, fissures, and condylomata. The tongue may become generally swollen, indurated at several points, at the edges and tip superficially ulcerated, the sores irritable and obstinate, sometimes spreading as if by a chronic phagedena, and the mucous surface of the cheeks and gums, as well as beneath the tongue, may be similarly affected.

Deafness is no unfrequent occurrence, probably from congestion of the mucous lining of the ear.

Iritis and *bubo* sometimes occur in this class, the latter usually indolent, and the former tending less to severity than when a secondary symptom.

The *testicles* not unfrequently undergo chronic and simple enlargement, with or without accumulation of serum in the tunica vaginalis.

Treatment.—The iodide of potassium, assisted by attention to the general health, especially as regards warm bathing and clothing, with the use of other alteratives, and a proper regimen, should be directed. In obstinate ostitic affections, attended with much nocturnal exacerbation, opiates are essential. Ordinary means failing, small doses of corrosive sublimate may be found useful.

Local affections of bones, joints, testicles, and glands are to be treated according to the general principles of surgery. Mercury should be avoided in the treatment of tertiary syphilis as a general rule; but sometimes, after every other course has failed, small

doses of mercury combined with iodide of potassium have the very best effect.

When the face, or other part of the surface, is covered with ulcerating tubercles, the tonsils ever and anon the seat of bad ulceration, the tongue and cheeks affected with a constant succession of painful ulcers, surrounded by induration, and extremely slow to heal; when such symptoms have resisted the ordinary non-mercurial treatment, and the patient is obviously declining in health, an alterative course of arsenic is sometimes of much service. Sarsaparilla and guaiac are highly recommended in tertiary syphilis. Sarsaparilla may be very useful when we get it fresh and good; but much of that which is made into sirup, &c., is little better than dried sticks, and too much reliance should not, therefore, be placed upon its medicinal virtues: there is one thing to be said, however,—that it can do no harm, and possesses, at least, the beneficial effects of simple sirup.

DISEASES OF THE BONES.

Exostosis signifies a bony tumour, or hypertrophy, formed by the irregular deposit of healthy osseous matter.

Diagnosis.—There is a smooth, irregular tumour, hard, and seldom painful. All bones are subject to this excess of growth; but it is generally situated on the upper part of the humerus, or lower part of the femur, and may remain a long time without becoming very large. Occasionally, the whole surface of a bone is rugged, scabrous, in tuberculated knobs, irregular excrescences, or spinous processes, sometimes several inches in length, terminating in sharp points, or knobs. The structure of these tumours is dense, like the cortical substance, or porous, like the cancelli. They cause no pain, unless when they encroach upon nerves or arteries: they may produce serious injury by being situated near important joints, on the internal surface of the cranium, or in the orbit of the eye.

The causes of this bony hypertrophy is not known: blows and pressure are sometimes presumed to create it.

Treatment.—Low diet; moderate purgation; local depletion,

if the tumour or neighbouring parts be inflamed ; pressure steadily applied where it can be borne ; blisters, kept open by savin ointment, mercurial plasters, or frictions with iodide or mercurial ointment. Where the tumour follows a blow, a slight degree of mercurial action upon the constitution is beneficial.

Where these measures fail, it may become necessary, for the relief of important organs and parts pressed upon, to remove the extraneous bony mass : when its anatomical situation does not preclude the operation, it should be cut down upon and removed by saw and chisel ; great care being taken to combat after inflammation.

CARIES is an inflammation of bone, generally producing *ulceration*, *softening*, and *suppuration*. The texture of the bone is altered, but its entire vitality is not destroyed.

All bones are liable to this diseased action, but the spongy bones suffer most, as the vertebræ, sternum, head of the thigh-bone, the carpus, &c.

The Causes of caries are, local injury, constitutional disorder, syphilis, mercury, and serofula.

Diagnosis.—According to Mr. Mayo, the external character of the limb is the same in caries as it is in necrosis : the bone appears enlarged, and one or more sinuses open from it at points that are soft, red, and sunken. A probe being passed into these sinuses, the softened texture of the carious bone yields before it, with a gritty feel.

Treatment.—If the disease depend upon any of the constitutional causes enumerated, the treatment must be general, and directed to the correction of the cause, according to the principles given for such conditions, as change of air, tonics, alteratives, &c. In cases arising from local injury, the chief point in the treatment is to combat and remove inflammatory action. The part should be kept at rest by splints and position ; local applications of dilute nitric, muriatic, or phosphoric acid, are often beneficial. In cases of constitutional caries, blisters, setons, and steady purging are useful. The best local treatment, according to some surgeons, consists in exposing and removing the whole of the diseased por-

tion of bone by the chisel or trephine, where its position admits of this proceeding.

Caries of the Spine is a very common affection among young children of scrofulous diathesis.

Diagnosis.—Before curvature or deformity appears, the patient complains of numbness, or an uncomfortable sensation in the lower extremities; he is languid, soon tires by exercise, and often stumbles in walking; when seated, the legs are drawn up under the chair and crossed: there is generally sickness of stomach, headache, flatulence, and derangement of the digestive organs. After the lapse of weeks or months, the lower extremities become paralysed, and the patient is unable to leave his bed; at this time more or less protuberance may be observed at some portion of the spinal column. Generally the disease is seated in the *dorsal* vertebræ, sometimes in the *lumbar*, but rarely in the *cervical* vertebræ.

If firm pressure be made upon the spinous processes of the vertebræ, the precise seat of the disease may be detected; for the patient shrinks from pressure upon the affected vertebræ.

Prognosis.—Few recover from this disease without permanent deformity, the bodies of several vertebræ being destroyed by caries; many die from irritation and hectic fever.

Treatment.—In the commencement of the disease great benefit results from the application of leeches, blisters, and issues or setons; caustic issues made at each side of the affected vertebræ are useful, and in some cases it is necessary to continue them for months or years. Great attention should be paid to the patient's diet, and his bowels should be opened two or three times a week by mild laxative medicines. The recumbent position is essential to relieve the diseased vertebræ from superincumbent weight,—but exercise in the open air is essential also; therefore the patient, whilst lying upon his mattress, should be taken out when the weather is pleasant. When there is good ground for the presumption that the caries of the bones is cured, and the patient begins to recover the use of his limbs, he should be allowed to take exercise by walking, assisted by a spine cart, which is so contrived as to relieve the spine from the weight of the head and shoulders.

Great care should be taken in the diagnosis of diseases of the spine, so as not to confound *distortions* of the spine with *caries*; for the treatment of these two conditions is different.

NECROSIS.

Necrosis signifies the death of the osseous tissue, arising either from inflammation of the bone or periosteum; there is separation of these two parts by pus, or other effusion between them, which results in the complete death of the bone. The shafts of the long bones are commonly the seat of the disease, particularly the femur and tibia.

Pathology.—This is given by Mr. Druitt as follows: “The bone dies,—its periosteum and the surrounding cellular tissue become infiltrated with lymph, which speedily ossifies, forming a new shell around the dead portion, and adhering to the living bone above and below it. The dead portion (technically called the *sequestrum*) generally consists of the circumference of the shaft only, and not of the entire thickness; for the interior of the shaft seems to be atrophied and absorbed after the death of the exterior. The inside of the sequestrum is usually rough, as if worm-eaten. In the majority of cases, the *epiphyses*, or articular extremities, are fortunately unaffected. After a time, if the *sequestrum* be removed by art or accident, the newly-formed shell contracts, its cavity is abolished, and it gradually assumes the shape and function of the former bone.”

Diagnosis.—After the acute inflammation subsides, the bone remains permanently enlarged, and sinuses remain, where matter was originally discharged,—from these, irritable, sensitive granulations spring. The sinous apertures in the skin correspond to holes in the shell of new bone, denominated *cloacæ*; by passing a probe through these orifices, the *sequestra* may often be felt movable in the interior.

Treatment.—The only thing that can be done in these cases to give relief, is to remove the dead bone. It is, therefore, necessary to let nature take her course, until the new bony case is formed,

and the dead portions of bone are detached; it then becomes necessary to remove the dead bone; in some instances this can be done by the aid of forceps alone, where the *cloacæ* are large, and the sequestra small; but generally it is necessary to dissect the integuments off the new bone, and cut an opening through its case by Hey's saw, the trephine, carpenter's bit and brace, or chisel, large enough to extract the dead bone, now a foreign body; the wound is then brought together as in ordinary cases, the part heals, and the patient recovers the use of the limb.

When the disease occupies the entire shaft of a long bone, or the articular surfaces of bones, amputation is sometimes called for, to save the patient sinking from constitutional irritation.

Exfoliation signifies the mortification and separation of a superficial layer of bone, without the formation of a shell of new bone, as in necrosis of the shaft of a bone. Exfoliation is generally caused by removal of the periosteum, or by mechanical or chemical injury. But removal of the periosteum is not invariably followed by exfoliation.

Treatment.—The application of a weak solution of nitric or muriatic acid is useful; the exfoliating portions of bone should be removed as early as possible.

SPINA VENTOSA.

Spina ventosa signifies a tumour arising from an internal caries of a bone.

The cylindrical bones are generally the seat of spina ventosa, although it occasionally attacks the flat bones.

Diagnosis.—This disease involves the whole circumference of a bone; the tumour is larger, and less firm than exostosis: it consists of a mere osseous shell perforated by many holes, and contains a thin sanies mixed with loose portions of lymph, or a substance resembling cheese.

Treatment.—When the phalanges are the seat of spina ventosa, it may be removed by long-continued moderate pressure upon the tumour. Cure of the disease will sometimes result from opening its cavity and throwing stimulating injections into it, or by exciting action in it by cutting instruments; thus filling it up by granulations.

When the large cylindrical bones are involved, the disease far advanced, and the tumour large, nothing remains to be done but to amputate.

ABSCESS IN BONE.—Abscess is a rare sequence of inflammation of bone. Mr. Liston speaks of this condition of the bones in the following terms:—"As the result of deposit of tubercular matter in the cancellated texture,—or of slow, and what is denominated scrofulous inflammation and suppuration,—ulcerated cavities are formed in the heads of long, and in the substance of short bones. Occasionally, though more rarely, the flat bones are similarly affected by an ulcerative process. Abscesses are sometimes also met with in the canals of long bones. Some make rapid progress, additional deposit takes place of osseous matter around the cavity, the periosteum becomes more vascular and thick, and even the neighbouring tissues are infiltrated and altered in appearance.

"Abscesses in bones, whether acute or chronic, discharge themselves externally through openings leading from the bone through the condensed cellular tissue and integument covering them. After a short time these openings become rounded off, and form cloacæ and papillæ, as they are termed; or, again, the matter finds its way into a joint, and by its presence involves and destroys the cartilages, synovial membrane, and fibrous tissues around.

"Acute inflammation of bone is often followed by formation of matter on its surface and under the periosteum; and this is sometimes connected with loss of vitality of the external lamellæ; or death of a great portion of bone may occur—the whole thickness of a flat bone to some extent, or the greater shaft of a long bone—as the effect of inflammatory action, the result of injury, or the consequence of some vice in the system."

Diagnosis.—Abscess may be suspected when, in addition to permanent inflammatory enlargement and tenderness, which may have lasted for years, there is a fixed pain at one particular spot, aggravated at night, and unrelieved by any remedy.

Treatment.—Upon the treatment, Mr. Liston observes, the surgeon will sometimes be called upon to open abscess of bone, by division of the superimposed parts; or even after matter has found its way to the surface, and discharge has been furnished, it may

be found necessary to give it a freer exit, so as to prevent accumulation, thus affording a chance of the secretion being gradually diminished and ultimately arrested by obliteration of the abnormal cavity. This is effected readily enough in some exposed bones, as the tibia, the lower end of the fibula, the great trochanter, and the ulna. The soft parts are divided by means of a strong pointed bistoury, and the exposed layer of bone is removed by the application of the crown of a trephine, of a large or small size, as may be demanded. By the use of a "trois-quarts" a cloaca, if such exist, may sometimes be sufficiently enlarged to allow of the object in view being effected. The unhealthy surface of the cavity may be thus removed, or escharotic or other applications made, if it be thought that advantage will arise from the practice. In the cavities of abscesses, in the cancellated texture, and sometimes in the shafts of bones, dead fragments, detached or not, are frequently discovered.

Cavities in bones, lined by secreting membrane, are much slower in contracting and healing than similar cavities in soft parts.

The surgeon is called upon to interfere and assist nature in all stages of this disease. By active management the inflammation may be arrested, and abscess or necrosis either prevented or limited. Great and instant relief may be afforded, and the extension of mischief guarded against, by a timely and free incision, as is seen in the more severe forms of paronychia, whether the bone has been primarily affected or not; and in an advanced period of the case, the removal of decayed parts, the presence of which always occasions great disturbance, may be effected with advantage. Interference is only admissible, however, when the exfoliation or sequestrum is completely detached by natural processes.

MOLLITIES OSSIUM.—Mollities ossium signifies softening of the bony tissue from a loss of earthy matter, leaving the animal matter in excess. Bones affected with mollities ossium are not, however, merely deprived of phosphate of lime; both the animal and saline parts appear to diminish until mere shells are left, which are so soft as to be easily cut with a knife. These shells have large cavities communicating with each other, and contain coagulated blood, or an oily matter. In some cases all the bones of the body are

simultaneously affected ; but the disease in any form is exceedingly rare, and confined almost exclusively to adult age.

Treatment.—Mollities ossium is incurable, unless when limited to small extent. Change of air, transition to high, warm, and dry situations, the use of nourishing animal food and generous wine ; dry frictions with aromatic substances over the body, and tonics of every kind, are the means employed to afford relief.

RACHITIS, OR RICKETS.—Rickets was formerly a common disease in Europe ; in this country it is rarely seen. It consists in an original deficiency of the earthy matter of bone. Children, between the age of six months and two years, are mostly subject to it.

Diagnosis.—Disorder of the digestive organs, swelling of the abdomen, emaciation of the limbs, dryness and discoloration of the skin, and blackness of the teeth ; these are soon followed by distortion of the limbs, spine, and ribs, which sink under the weight of the body, and bend from muscular action. In bad cases, the patient is horribly deformed.

Treatment.—The chief indications in the treatment of this disease, are to strengthen the system by tonics, to keep the stomach and bowels free from acidity by gentle purgatives frequently repeated, and to place the patient upon a nutritious diet, consisting wholly of animal food. Local remedies are also serviceable, as frictions with stimulating oils, frequent ablution with salt water, and after the patient has gained sufficient strength, the use of the apparatus for disease of the spine, in hours of exercise, to give support to the upper part of the body.

FRAGILITAS OSSIUM.—Extreme brittleness of bone from old age, syphilis, scurvy, and other constitutional diseases, is sometimes met with. This condition depends probably upon a deficiency of animal and an excess of earthy matter in the osseous tissue. Bones thus affected, however, do not upon examination always present the appearances we should be led to expect ; for instead of the usual proportion of earthy and a deficiency of gelatinous matter, they appear to be completely saturated with oil, and cannot be entirely divested of it.

Treatment.—Fragilitas, like mollities ossium, may generally be considered incurable. Some advantage may, however, be derived from the internal administration of medicines, when the disease depends upon a constitutional cause.

NON-MALIGNANT TUMOURS OF BONE.

TUMOUR FROM EXTRAVASATED BLOOD.—Mr. Travers describes a case in which, after a blow, the clavicle enlarged into a firm oval, elastic tumour, which, when punctured by a grooved needle, yielded a few drops of dark grumous blood. The whole bone was extirpated. On examination, it was proven that the tumour had evidently originated in a rupture of the vessels of the bone, and an extravasation of blood into the cancelli. By the pressure of this blood, and a continuance of the extravasation, the bony tissue was expanded and absorbed, and the cancelli were converted into chambers filled with dark solid coagula. The tumour was invested by the periosteum.

OSTEO-ANEURISM.—This consists in that disease of the capillaries of the bone, which is called *aneurism by anastomosis*. The bone affected is generally the tibia just below the knee.

Diagnosis.—The patient complains of a sudden pain in the part; this is followed by a painful swelling, and the veins of the leg are tense and full. After a time the whole limb becomes dark red, and painful; the tumour becomes distinctly pulsatory.

This disease is rare. On examination, the tumour is found to be composed of a tissue filled with clots of blood in concentric layers, each clot communicating with a dilated artery; the bone expanded, thinned, and absorbed, as in the last case.

Treatment.—Ligature of the main arterial trunk of the limb, or amputation, is the only remedy.

CARTILAGINOUS EXOSTOSIS, ENCHONDROMA.—This tumour is described by Müller as a firm spheroidal tumour consisting of masses of true cartilage, embedded in a fibro-membranous cellular structure. When boiled it yields a variety of gelatine, termed *chondrine*. It may be developed in the centre of a bone, or on

its surface. In the former case, it causes the bone to expand and be absorbed before it, till at last it is covered by a mere shell.

This tumour ordinarily affects only one bone: it is occasionally found in the glands, especially the parotid. It is not malignant, although incurable, and may, by its continued growth, distend the skin, and cause ulceration; thus wearing out the constitution by the irritation and discharge it creates; still it does not return if thoroughly extirpated.

Treatment.—Extirpation is the only effectual remedy for this disease.

A *hard, fibrous, or fibro-cartilaginous tumour*, containing bony spiculæ, may be developed in the substance, or on the surface of bone, especially of the superior or inferior maxillary.

HYDATIDS are also occasionally developed in bone.

MALIGNANT TUMOURS OF BONE.

OSTEO-SARCOMA is a form of cartilaginous growth, containing numerous cysts filled with a reddish fluid, having a kind of skeleton composed of thin papery plates and spiculæ of bones dispersed arborescently like coral through it.

This disease may attack any of the bones, but the long bones of the extremities are those commonly affected. Old persons are seldom affected with osteo-sarcoma.

Diagnosis.—Sometimes a long-continued, deep-seated, lancinating pain, occupies some part of the bony system, long before any tumour or swelling is evident. At other times, a distinct tumour is perceptible from the first, gradually increases, and is not painful or inconvenient until it acquires considerable bulk and takes on inflammation; the pain is then extremely severe. The form of the tumour is either smooth and circumscribed, or irregular; for the most part, the general swelling is studded over with knots or protuberances of various dimensions; the apices of which, in the advanced stages of the disease, are apt to ulcerate and discharge a small quantity of thin fetid matter. Often, however, the whole tumour becomes enormous, and extremely ponderous, without the

slightest ulceration of the integuments. When examined by the touch, the tumour feels solid and incompressible, or if any evidence exists of fluctuation, it is only at particular spots, and even then indistinct. The patient becomes thin, sallow, and debilitated; the bowels are alternately constipated and relaxed. In the advanced stages of the disease when the tumour is large, ulcerated, and sloughing, hectic fever, and its consequences, or confirmed phthisis pulmonalis, finally destroys the patient.

Treatment.—There is a possibility of removing this disease if taken in its incipient stage, by local and constitutional remedies. The local means consist in leeches applied to the part, or its vicinity; blisters often repeated, and kept open by savin cerate, and pressure steadily applied to the tumour. The constitutional means are low diet, purgation, and Sir Astley Cooper recommends highly in this disease, the use of the oxymuriate of mercury, combined with the compound decoction of sarsaparilla. These means failing, amputation is generally called for; but unfortunately, this does not always prove successful, for the disease has reappeared on the stump, after the operation.

MEDULLARY SARCOMA is perhaps the most frequent malignant disease of bone. It generally (says Mr. Mayo) “arises in the cancellous structure; it is therefore usually attended with considerable pain, for the growth of the tumour is rapid, and the shell of the bone has to be partly absorbed, partly mechanically forced open from within.”

Scirrhus, in bone, is generally a concomitant of the disease in the breast, or in some other part. The femur is the bone most frequently affected, and is often fractured in consequence of the scirrhus deposit and atrophy of its proper texture.

The chief points which distinguish the malignant from the non-malignant tumours are, their greater rapidity of growth; the greater pain with which they are accompanied; their greater softness at some points than others; their tendency to involve and become blended with the skin and other adjacent tissues, are sure characteristics of malignant growth and the existence of malignant cachexia.

But it is often impossible to distinguish these two classes of tu-

mours from each other, or from inflammatory enlargements. It is satisfactory to know that the early treatment of them is always the same.

The measures that will eradicate the curable affections, will check the incurable. They are, repeated leeching, mild mercurial alteratives, sarsaparilla, with small doses of the iodide of potassium, and change of air and other general tonics. If these measures fail, the only recourse is amputation or extirpation, which may be performed with confidence of a cure as regards non-malignant growths; but the extirpation of truly malignant growths, to be effectual, should be early and complete; a partial removal being, according to Mr. Liston, an unmeaning and utterly useless cruelty.

DISEASES AND INJURIES OF JOINTS.

ACUTE INFLAMMATION OF THE SYNOVIAL MEMBRANE, *Synovitis*, may be produced by *local* injuries or *constitutional* causes, as the gouty and rheumatic diatheses, constitutional syphilis, or the abuse of mercury; it sometimes follows gonorrhœa. It seldom attacks children. The knee-joint is mostly affected.

Diagnosis.—Severe aching pain in the joint, aggravated by motion, great swelling occurring immediately after the pain, redness and tenderness of the skin, and fever, which is often violent. The swelling is peculiar, and distinctive of the disease: it is occasioned by a rapid effusion of fluid into the synovial cavity, and if the joint be superficial, fluctuation is distinct. When the knee joint is the seat of the disease, the patella is protruded forwards, with great fulness at each side of it, and at the lower and front part of the thigh. At the elbow, the swelling is most marked above the olecranon: in the hip and shoulder joints, there is a general fulness of the surrounding muscles.

Prognosis.—The disease is more serious when it affects but one joint, particularly when it arises from local injury, especially a penetrating wound, than when it affects many joints, and arises from constitutional disorder. The danger to life in any case will

be proportionate to the severity of the febrile symptoms, and the rapidity and sharpness of the pulse: delirium or typhoid symptoms indicate great peril.

In severe cases, the membrane may suppurate and the cartilage ulcerate, permanent ankylosis being the least evil that may follow; whilst milder cases will be merely followed by a stiffness that may be gradually removed by treatment.

Treatment.—The whole limb must be kept perfectly motionless by the application of a splint. If the patient be robust, venesection should be resorted to; if not, free leeching to the joint, or cupping near it: these may be conjoined with general bleeding, in severe cases. Ice, evaporating lotions, warm poppy fomentations, or a poultice of chamomile flowers, boiled until they are soft; whichever proves the most soothing application to the patient should be employed: moderate purgation, salines, calomel, with opium and antimony, in moderate doses, every four hours, until slight ptialism is produced: opiates may be given at night, to relieve pain.

When the disease is at all dependent upon gout or rheumatism, colchicum should be administered also; but when it is dependent upon the abuse of mercury, the iodide of potassium should be given in its stead, in three-grain doses, or more, three times a day, sarsaparilla being taken freely.

CHRONIC INFLAMMATION OF THE SYNOVIAL MEMBRANE.—

Diagnosis.—Chronic inflammation of the synovial membrane may be known by swelling of the joint, a dull aching pain, with a sense of weakness and relaxation, the pain in the joint not being aggravated by pressure. The swelling always appears a few days after the pain, and sometimes, in cases of an indolent character, it is the only symptom present. These cases are called *hydrops articuli* or *hyarthrus*.

If the disease continue, the synovial membrane and surrounding tissues become thickened and gristly, the swelling loses its softness and fluctuation. In neglected cases, the inflammation leads to ulceration of the cartilages, and destruction of the joint.

The *causes* of the chronic are the same as those of the acute form of inflammation, of which it may be a sequel.

Treatment.—If the cause of the disease be constitutional, arising from gout, rheumatism, syphilis, mercury, or gonorrhœa, the principles of treatment already given for such affections, must be employed to eradicate the cause of disorder. Where the affection is the sequence of local injury, and there is activity about the inflammation, especially an increase of aching pain at night, the part should be placed at rest in wooden or felt splints, or starch bandage, leeches or cups being frequently applied, and the part bathed with cold lotions. The activity of the inflammation having subsided, blisters will now be found as useful in the chronic form of the disease, as they were hurtful in the acute. They should be applied in succession and quickly healed; if the joint be superficial, as the knee, they should not be put too near it. Strong acetum cantharides, and aqua ammonia, will often be found convenient substitutes. After the blistering, when the activity of the disease has subsided, tartar emetic ointment, mercurial ointment, liniments of mercury, cantharides, turpentine, and the tincture of aconite, with the *douche*, or affusion with hot water, the vapour bath, and passive motion, will complete the cure. All stimulating applications and motion must be stopped if they create heat and pain, and other means employed to arrest these symptoms.

HIP DISEASE, COXALGIA, OR MORBUS COXARIUS.—The hip joint is exceedingly liable to disease; persons of all ages are affected by it, but scrofulous children are mostly the sufferers from this affection. The usual forms of this disease are the chronic ulceration of cartilage in the adult, and scrofulous caries of the head of the femur in children. The symptoms and consequences of both are nearly the same.

Diagnosis.—Occasionally there is slight pain, and more or less lameness; as the disease progresses, the pain becomes excruciating in cases of ulceration of cartilage, but in scrofulous caries it is comparatively trifling; in both forms it is felt chiefly in the knee. In scrofulous caries, the pain in the knee may be the only symptom, and the knee may even be swelled. If the hip joint be moved, or if the femur be suddenly forced upwards against the acetabulum, severe pain will be felt in the hip, and the pain in the knee increased. There is tenderness in the groin and behind the trochan-

ter major. The inguinal glands sometimes swell, and the nates of the affected side become wasted and flabby. The chief characteristic sign in hip disease, is the apparent lengthening of the affected limb. There is not, in reality, any lengthening of the limb, but it appears longer from the position the patient assumes, and from his generally resting the body upon the sound limb. Many reasons have been given for this apparent variation in length; it arises probably from the position the patient assumes. But if the disease proceed, it is succeeded by positive shortening, due to the destruction of the neck of the femur, by caries, or more commonly to the destruction of the acetabulum and capsular ligament, and the dislocation of the bone upwards, by muscular action. The position which the limb assumes is accidental; sometimes it is turned inwards, as in dislocation on the dorsum ilii, or outwards, as in fracture of the neck of the femur. This organic shortening is generally soon followed by abscess, which may burst on the thigh, groin, into the pelvis, or rectum.

Prognosis.—If the disease be taken early in hand, the prognosis is favourable; but when it advances to the stage of abscess and dislocation in adults, they rarely recover; although in children whose strength is pretty good, even under the same circumstances, the prognosis is not so unfavourable.

Treatment.—Absolute rest must be enjoined, and the starch or dextrine bandage, leather or felt splint applied, and the patient kept lying upon a fracture-bed. In the early stages of the disease, cupping, and counter-irritation by means of an issue behind the great trochanter, or at the anterior edge of the tensor vaginæ femoris, or by a seton in the groin, is beneficial. When shortening has commenced, great comfort and advantage may be derived from keeping up constant extension of the limb by a weight attached to the thigh above the knee, by means of a chord passing over a pulley at the foot of the bed.

During the suppurative stage, the patient's strength must be supported by tonics and good diet. The treatment of this disease is always protracted, as its beneficial effects are not apparent under some months. Dr. Physick's plan of treatment in this affection is to commence with a mercurial purge; if the parts

about the joint be swollen, leeches are applied; the diet is wholesome and light: he then places the patient upon a hair mattrass, and commences a systematic course of purgation, giving the preference to cream of tartar and jalap, administered every other day, in sufficient doses to procure several copious evacuations per diem. Having pursued this treatment for a few weeks, he then applies a carved splint, which is made to fit the limb perfectly, extending from the middle of the side of the thorax, nearly as far down as the internal malleolus; it should be wide enough to extend nearly half way round the parts to which it is applied; the inside of the splint should be carefully wadded, to prevent excoriation, and be kept in position by rollers. The splint must be carved to adapt itself to the exact position of the limb, however crooked it may be. After a time, when the inflammation and swelling are much relieved, another splint may be made, straighter than the first, and in this way some cases require as many as four splints; but two is generally the greatest limit. Abscess must be treated according to the principles for large chronic abscess.

FUNGUS ARTICULI, OR WHITE SWELLING.

Pulpy Fungus consists in the conversion of the synovial membrane into a thick pulpy substance of a light or reddish-brown colour, intersected by white membranous lines. It produces, after a time, ulceration of the cartilages, caries of the bones, wasting of the ligaments, and abscess in various places.

Adults are more liable to the disease than children. All the joints are subject to this affection; but the knee-joint is the most frequent seat of it.

Diagnosis.—General swelling of the articulation, with stiffness, but without pain; the part is soft and elastic to the touch, yet there is no fluctuation.

Treatment.—In the early stage, or acute form of the disease, bloodletting, and repeated applications of blisters to the joint, are to be made; the affected part should be elevated, and kept perfectly still by the application of splints, or starch bandage. After

the inflammation has subsided, stimulating liniments, with moderate exercise of the joint, may be employed. But after a longer or shorter duration of the indolent stage, ulceration of the cartilage and hectic come on, and the patient can only be saved by amputation.

MOVABLE CARTILAGE.

Cartilaginous excrescences commence as little pendulous growths upon the synovial membrane, which becomes accidentally detached. The articulations of the lower jaw, elbow, knee, and ankle joints, as well as others, are liable to this affection; but the knee joint is its most common seat. The number of these cartilages vary from one to twenty or thirty.

Diagnosis.—When situated in the knee joint, they may be felt to move from place to place, whilst the capsular ligament is so distended, generally with the synovial fluid, as to create evident fluctuation. If they get between the bones, when the joint is in motion, they cause excruciating pain and faintness, followed by inflammation.

Treatment.—The danger of cutting into the cavity of a joint, under any circumstances, is generally imminent, and should always be avoided, if possible. The knee should be bandaged by laced kneecaps or bandages, so applied as to prevent the loose cartilages getting between the bones. If these means fail, then they must be removed by an operation. For this purpose the surgeon fixes the cartilage firmly with his fingers, and then cuts down upon it, making a valvular incision, as small as possible, and extracts it by means of forceps or tenaculum; the wound must then be closed, and the patient kept quietly in bed, and every care taken to prevent inflammation.

Pendulous, fleshy, or gristly tumours may produce many of the symptoms of loose cartilages. They may perhaps be distinguished by being less hard. They have been extirpated from the knee, but of course with great hazard to life.

ABSCCESS IN JOINTS.—A rapid effusion of pus into the joints is a

frequent occurrence in glanders, phlebitis, puerperal fever, diffuse cellular inflammation, dissection wounds, and in other cases in which the blood is contaminated by a morbid poison.

Diagnosis.—If, after acute or chronic inflammation, a joint becomes very much distended, and there is constant pain, unmitigated by appropriate remedies, with considerable constitutional excitement, *suppuration* of the synovial membrane may be fairly suspected.

Treatment.—A puncture should be made into the joint with a grooved needle, and the exuding fluid examined. If it prove to be serum, two or three punctures more should be made, and the fluid extracted by means of a cupping-glass applied over them. If the exuding fluid prove to be pus, a free incision should be made with a lancet in a depending part, to give free egress to the pus; the limb should be placed in splints, in the most easy and convenient posture; the general health improved by tonics, alteratives, and good diet. In favourable cases a cure will be effected by *anchylosis*; therefore, at the time this commences, the limb must be placed in a proper position for this permanent stiffening. Thus, if the elbow joint be the seat of the disease, it should be placed in splints, and kept bent at a right angle, because in this position it will be more useful. When the knee is the seat of the affection, the straight position of the limb, or but slightly bent, will be found the best.

In cases where the constitutional disturbance and suppuration continue to increase, amputation of the limb must be performed to save the patient from sinking.

ULCERATION OF CARTILAGE.—*Acute ulceration* of cartilage frequently accompanies the acute inflammation and suppuration of the synovial membrane, which follows penetrating wounds.

The cartilage rapidly disappears, but the exposed surface is healthy, and readily granulates and heals, if the patient have escaped with life. Sir B. Brodie and Mr. Mayo relate several cases of acute idiopathic ulceration of cartilage, followed by anchylosis, and “attended, not with effusion into the joint, but with suppuration or œdema external to it.”

Chronic ulceration of cartilage is one of the most important affections of joints, and ought to elicit careful study. Persons

of bad, scrofulous constitutions, between the ages of puberty and thirty-five, are generally the subjects of this disease.

It is usually ascribed to cold, or neglected injury. It is mostly an *idiopathic* or *primary* affection, and may be the consequence of caries of the bone or neglected chronic inflammation of the synovial membrane.

Diagnosis.—For the first few weeks or months, there is slight occasional rheumatic pains, and trifling lameness of the joint. The pain increases, particularly at night, it is confined to a small spot deep in the joint, and is like the gnawing of an animal: usually it is accompanied by aching of the wrist, when the elbow is affected, and of the knee, when the affection is seated in the hip: the pain is always increased by motion of the joint. As the disease advances, the pain is excruciating, with spasm and starting of the limb during sleep, the patient's rest is broken, and his general health rapidly impaired.

There is very little tumefaction of the joint in this affection; even this does not come on until four or five weeks, or months after the pain has commenced; there is no effusion into the joint; the swelling is due to infiltration of the tissues around it.

Prognosis.—The termination may be favourable, if the disease be seen early and treated properly; but after swelling has existed for some time, ankylosis may be considered a favourable result: when suppuration appears in an adult, amputation is almost certain.

Treatment.—Perfect rest must be insured, by confining the limb in splints and bandages, which should have holes in them, to admit the application of counter-irritants. In the early stages, when the pain is severe, leeches, or cups should be applied, aided by counter-irritation, either by seton, caustic issue, or the actual cautery. The knee being the seat of the disease, an issue should be established upon each side of the head of the tibia; and, according to Sir B. Brodie, it is better to keep it open by occasional touchings with caustic potassa, or sulphate of copper. The actual cautery is a useful remedy in this affection. In children, a blister should be applied to the seat of the disease, and afterwards kept open. If abscess form, it is better not to be hasty in opening it, but to

wait until the skin becomes very much distended ; it should then be punctured, and the matter allowed to escape slowly, and the case treated afterwards as directed for abscess of joint. When the strength of the patient fails, tonics must be administered ; pain being relieved by opiates.

ARTICULAR CARIES.—Caries of the head of a bone is a common cause of ulceration of cartilage and disorganization of joints. Scrofulous subjects are most liable to this affection ; it is common in children, but rare in persons after thirty years of age ; the knee, elbow, and the bones of the tarsus and carpus, are usually the parts affected.

Diagnosis.—The symptoms are nearly the same as those of ulceration of cartilage ; in scrofulous cases there is remarkable absence of pain, except during the formation and bursting of abscesses. The affected bone is found to be soft, red, vascular, and deficient in earthy matter, so as to be easily cut or crushed ; its cancelli are filled with reddish fluid. In scrofulous cases, they are filled with cheesy matter.

Treatment.—This does not differ from that recommended for ulceration of cartilage ; except that *issues* are not advisable in genuine scrofulous cases, unless the pain be severe and continuous : abscesses should be allowed to open spontaneously : amputation is not called for as quickly as in ulceration of cartilage.

ANCHYLOSIS.—Anchylosis or immobility is a frequent consequence of serious injuries and diseases of joints ; when it becomes an inevitable consequence, the limb should be placed in a position, in which it will be most available to the individual in his ordinary occupations ; as a general rule, the elbow should be fixed at a right angle ; the wrist straight, the hip and knee straight or a little bent, and the foot at a right angle to the leg.

There are three varieties of anchylosis : the *spurious* or *false*, *ligamentous*, and *bony*.

The *spurious* or *false* results from thickening and deposit into the synovial membrane and ligaments, and rigidity of the muscles. The extensor muscles in almost all cases, where the joint is diseased, become wasted and paralysed ; the flexors fall into a state of rigid

atrophy, and by their continued action dislocate the joint. This is a common form of ankylosis after synovitis.

Ligamentous ankylosis, is the union of articular surfaces by ligament; it is an occasional sequence of compound dislocation, or ulceration of cartilage.

Bony ankylosis is the result of ossification of the lymph effused in a joint after the destruction of its cartilage, thus fusing two bones into one.

Treatment.—*False ankylosis* is the only form which can be said to be curable; the joint and muscles of the limb should be vigorously rubbed daily with stimulating liniments; shampooing, vapour or local steam baths, and passive motion, by bending the joint daily, without producing much pain, are the appropriate remedies.

Ligamentous ankylosis only admits of gentle passive motion.

Bony ankylosis is incurable.

WOUNDS OF JOINTS.

Diagnosis.—Wounds penetrating joints may generally be known, though not invariably, by the escape of the synovial fluid, which is commonly seen like small oily globules.

Treatment.—The most important point in the treatment is to avert inflammation of the synovial membrane: immediately after the receipt of the wound, the part should be carefully brought together, the joint placed in a splint, and kept motionless; employing local and general antiphlogistic means, if it be a large joint, to prevent or arrest inflammation. If the soft parts be so injured that the joint, especially the knee, cannot be covered, or is certain not to unite, and the patient's constitution is bad, it becomes necessary to perform amputation at once.

INJURIES AND DISEASES OF THE EAR.

The external ear may be separated from the head by wound or slough, without perceptibly impairing the functions of the organ of

hearing. The lobe of the external ear is often the seat of disease, especially sarcomatous, encysted, or steatomatous tumours. The treatment of these affections is the same here as elsewhere.

Foreign bodies are often inserted by children into the meatus auditorius externus; insects and worms creep into it frequently; the *cerumen* or wax often accumulates and becomes a dry, inspissated mass, acting as a foreign body.

Treatment.—These bodies can be washed out generally by injecting water into the external ear, or by the introduction of a bent probe or curette.

POLYPUS OF THE EAR.—Two forms of *polypi* are found connected to the lining membrane of the meatus externus; one *soft* and *pulpy*, like the mucous polypus of the nose,—the other *firm* and *fleshy*, resembling the solid polypus of the vagina; both varieties are simple in structure and tendency.

Diagnosis.—The polypus can readily be seen; there is deafness, an uncomfortable sensation in the part, and a puriform discharge.

Treatment.—The tumour should be seized by delicate forceps, and twisted or torn away; when the pain and bleeding have subsided, the site of the polypus should be touched with nitrate of silver, to prevent the return of the disease, and to destroy any remaining portions. If the relaxation of the membrane and discharge be troublesome, the ear must be injected with gentle stimulating and astringent solutions.

OTITIS.—The mucous membrane, and other textures of the ear, are subject to inflammation; it is said to be *internal*, when it is inside the membrana tympani,—*external*, when outside this membrane.

External Otitis generally occurs in children, from exposure to cold; it constitutes the common earache.

Resolution may occur, or pus may be discharged from the membrane, or abscess may form beneath the membrane, causing much tumefaction and distress.

Treatment.—This should be antiphlogistic; leeching behind the ear, fomentation, hot poultices, purgation, and antimony.

When abscess forms, hot poultices should be applied, and the abscess opened with a lancet.

Internal Otitis is a more serious affection than the former ; it is caused by injury, exposure to cold, and extension of inflammation from the external ear, or from the nares and fauces along the Eustachian tube into the middle ear.

Diagnosis.—There is a deep-seated, intolerable pain, with throbbing, and well-marked inflammatory fever. If suppuration occur, disruption of the internal ear, with loss of hearing, is all but inevitable.

Treatment.—This should be actively antiphlogistic : venesection, the application of leeches to the part ; calomel and opium, in severe cases, producing slight ptyalism, and maintaining it whilst the inflammatory symptoms continue.

When matter has formed in the cavity of the tympanum and accumulated in quantity, the membrana tympani being tense, white, and prominent ; under these circumstances it should be punctured, to give vent to the pus, so as to save, if possible, the delicate and complicated apparatus of hearing, from destruction.

OTORRHŒA signifies a puriform or purulent discharge from the ear, the result of chronic inflammation. It is usually preceded by symptoms of subacute or acute otitis. Scrofulous children are most liable to otorrhœa. The ear should be examined carefully with a speculum : if the membrana tympani be found entire and tolerably sound, the affection is comparatively simple ; but if the membrane be imperfect, denoting an internal origin of the suppuration, the case is decidedly more unfavourable.

Treatment.—This is mainly palliative and expectant, as regards the part, and restorative, as regards the system. The constitutional cachexy is to be combated by the usual means ; the ear kept clean by repeated and careful use of tepid water ; increase of inflammation subdued by leeches, fomentation, and blistering behind the ear ; being careful to omit these, if the glands about the neck swell in consequence of their application. After nearly all the inflammatory symptoms have subsided, astringent injections may be employed, using them with care, however, so as not to

arrest the discharge too suddenly, lest a return of the inflammation be induced.

There is a class of cases, in which head-symptoms of an alarming, or at least of a suspicious character, undergo a marked and rapid mitigation on the occurrence of discharge from the ear. In such cases, it is wrong to attempt to arrest the discharge, even by the most simple means.

Otorrhœa is occasionally connected with a degenerated condition of the pars petrosa of the temporal bone, which has softened and become converted into a medullary mass. The symptoms are cerebral and obscure, the issue hopeless: by arrest of the aural discharge, death would be accelerated.

ABSCESS OF THE MASTOID CELLS.—Inflammatory action may originate in the cancellated texture of that part of the temporal bone which constitutes the mastoid process. It may result from external injury, but more frequently occurs in strumous habits without any assignable exciting cause: it is liable to invade such systems, if they have been abused by the immoderate use of mercury. It is more common in young persons than old.

Prognosis.—If suppuration be attained, true caries will hardly fail to be established, and is usually complicated with necrosis, portions of the osseous texture separating in the form of sequestra. The internal ear having been involved, hopeless deafness will ensue; paralysis of that side of the face is not improbable, from implication of the portio dura; it is even possible that the contents of the calvarium may be attacked, imminently perilling existence; life may be hazarded, also, by hectic produced by a continued and wasting discharge.

Treatment.—If the disease be seen in its primary stages, every possible means must be promptly applied to arrest the inflammatory action, to prevent suppuration and caries. When there is reason to suppose that matter has formed, an opening must be made to discharge it, otherwise there is great danger by extension of the suppuration. If caries be established, the ordinary treatment is to be followed out, by free exposure of the part, and removal of the carious surface. From local treatment alone, little good

may be expected; constitutional means must be at the same time sedulously employed.

OTALGIA.—This constitutes true ear-ache, being a neuralgic affection, unconnected directly with the inflammatory process. Frequently it is connected with irritation in the mouth.

Treatment.—The pain is very distressing; it has all the characteristics of neuralgia, and is amenable to the same treatment. The mouth should be examined, removing all stumps and decayed teeth, from which it would be likely to arise. If there be inflamed gums, or abscess, it should be attended to, for the pain in the ear will sometimes disappear with the removal of these lesions. Among the best local applications is the tincture of aconite: externally, to the neighbouring parts, strong aqua ammonia may be beneficially applied for two or three minutes at a time. The tincture of aconite can be freely applied within the meatus and to the neighbouring parts for a long time, if necessary.

PERFORATION OF THE MEMBRANA TYMPANI.—This operation is not often called for; it is deemed advisable when, by insuperable obstruction of the Eustachian tube, access of atmospheric air is denied to the cavity of the tympanum; also when that cavity has become obstructed by extravasation of blood. The necessity for simple puncture, in the case of abscess of the tympanum, has been already noticed.

In cases of deafness caused by obstruction of the Eustachian tube, the object is not merely to make an aperture in the membrane, but to keep it pervious, so as to atone permanently for the want of the accustomed atmospheric supply to the middle ear through the Eustachian tube. This operation is best accomplished by the instrument of Fabricci, with which a circular portion of the membrana tympani can be taken out. The operation should be performed upon the inferior part of the membrane, so as not to interfere with the manubrium of the malleus.

HEMORRHAGE FROM THE EAR.—This may proceed from many causes, and requires treatment as various. Bleeding from the ear is one of the most prominent and dangerous symptoms of fracture of the base of the cranium.

Laceration of the lining membrane of the meatus, without other

injury, may furnish a copious discharge of blood. It rarely proves excessive, requiring little or no treatment. The hemorrhage may be the result of a blow, a fall, or direct injury done to the part. Passive hemorrhage may take place from this, as from other mucous surfaces; this is amenable to the ordinary treatment in such cases, both local and constitutional. The internal carotid artery may be opened into by ulceration; in this case the hemorrhage will be constant, copious, and of the arterial character. The only sure remedy in such cases is ligature of the common carotid artery. The lateral sinuses may also be opened into by ulceration; in this case the bleeding will be dark-coloured and venous. Venous hemorrhage may be arrested by pressure.

HYPERTROPHY OF THE AURICLE.—This is a disease of rare occurrence; it mostly affects the lobe. It is generally found in women.

If it be excessive, irksome, or unsightly, the redundancy may be removed by the knife.

CONGENITAL OCCLUSION OF THE MEATUS.—The meatus may be congenitally imperforate. It may be fully developed in all respects, but covered by integument. In such a case, mere incision of the skin, dressed so as to prevent contraction, will suffice for a cure.

A thick fleshy covering may conceal the cartilaginous tube, which is only partially developed. In this case a careful and regular dissection may accomplish a cure, probably more imperfectly than in the former case.

The external apparatus of hearing may be altogether deficient, the bone itself being imperforate. Such persons have been known to possess the sense of hearing. It is presumed, therefore, that hearing was accomplished by the conduction of sound through the bones of the cranium to internal ears perfectly constructed. But such cases are wholly beyond the art of surgery.

DEAFNESS may proceed from the affections already mentioned, as well as from other causes.

In order to arrive at a true diagnosis, careful examination of the external meatus and membrana tympani is essential; a speculum is of great service in effecting this object.

Accumulation of the inspissated cerumen within the meatus, is a frequent cause of deafness.

A deficiency of ceruminous secretion is an occasional, but less frequent cause of deafness. The meatus is dry and empty, whilst the membrana tympani is clear and glistening. Stimulants are useful in restoring the secretion, as the essential oils, more or less diluted, assisted by stimulating frictions around the auricle.

Thickening of the lining membrane of the meatus is a cause of deafness, the result of chronic inflammation. The treatment of this condition consists in the application of a solution of nitrate of silver, sulphate of copper, zinc, or the tincture of iodine to the part by means of a hair pencil. These should be aided by counter-irritation behind the ear, and attention to the general health.

The membrana tympani may be changed in structure, thickened, congested by inflammatory action, and thus produce deafness. The same treatment as recommended in the former case should be applied to this.

Imperfection of the membrane by ulceration or by rupture from injury, is not amenable to treatment. The deficiency may possibly be repaired by nature.

A great majority of cases of deafness arise from disorder of the *internal ear*. The change may be in the lining membrane, in the osseous texture, or in the nerves; but the most usual site of disorder is in the lining membrane; fortunately, the texture most susceptible of treatment. This consists in attention to the general health, moderate local depletions, and patient perseverance in counter-irritation.

The extremity of the Eustachian tube may be obstructed in various ways, and deafness result. It may be closed by enlarged tonsils, or by nasal polypi hanging from the posterior nares. In such cases, the removal of the cause will relieve the deafness.

Ulceration of the fauces, implicating the extremity of the Eustachian tube, may cause serious obstruction, by the contraction attendant on cicatrization. This can only be obviated by speedily healing the ulcer, whilst it is of slight extent. The contraction should be remedied, as far as possible, by the introduction of probes, or catgut bougies.

Another cause of deafness, is a redundancy of mucus in the Eustachian tube. This may be relieved by what is termed *cathe-terism*, which consists in passing a catheter into the tube, and clearing it of mucus by blowing through it; air then has access to the middle ear, and hearing is restored. A patient who is accustomed to this operation, can pass one end of an elastic catheter into the Eustachian tube, the other into the mouth, and thus in an instant operate effectually for himself.

In chronic affections of the membrane of the middle ear, it is possible that benefit may sometimes follow the careful injection of water, air, or medicated vapour into the cavity. This may be accomplished by means of the Eustachian catheter, with a suitable syringe.

Organic change in the brain, or in the auditory nerve, is not an unfrequent cause of deafness, and seldom admits of successful treatment. Moderate mercurialism, with counter-irritation, are the best means to be employed in such cases.

Functional disorder of the nerve is a more frequent and more manageable cause of deafness; it is induced by blows, falls, loud noises, disorder of the general health, &c. The *treatment* consists in removing the exciting cause, the application of counter-irritation, mild mercurialism, and the endermoid use of strychnia, or a few drops of the tincture of strychnia may be dropped into the ear, from time to time.

Determination of blood to the head, in consequence of suppression of a normal or habitual discharge, or in whatever way induced, is likely to produce a certain degree of deafness, along with noises and other unpleasant sensations in the head.

The treatment consists in leeching, cupping, purging, and other means calculated to correct local plethora.

INJURIES AND DISEASES OF THE EYE.

CATARRHAL OPHTHALMIA.—The seat of simple catarrhal ophthalmia, is the conjunctiva; as soon as the sclerotica becomes injected, the catarrhal ophthalmia is combined, and becomes either catarrho-rheumatic, or catarrho-arthritic ophthalmia.

Diagnosis.—Stiffness, itching, smarting, uneasiness on exposure to the light, watering, redness, and a sensation as if sand or gravel had gotten into the eye. The palpebral conjunctiva is covered with fine striæ of a vermilion red; in some cases, circumscribed granulations may be perceived, of a little lighter tinge, and slightly diaphanous; the palpebral conjunctiva, and especially the great fold



of this membrane, is relaxed and its volume may be two or three times greater than in the normal state; the injection of the ocular conjunctiva is composed of vessels which have a regular distribution; their trunks are turned towards the palpebral conjunctiva; they are slightly flexuous and nearly parallel. In approaching the cornea they bifurcate and terminate in very fine points, at the distance of a line and a half or two lines from the circumference of the cornea, so as to leave around the latter a space having the form of a belt which is free from redness.

The sight is troubled towards night, on account of the mucus secreted at that time in larger quantities, and precipitated in the form of filaments upon the cornea.

Terminations.—Resolution, chemosis, granulations, pannus produced by the latter, pustules, and ulceration of the conjunctiva and cornea.

Causes.—Exposure to cold and damp; there is also a pathological state of the mucous membrane throughout the system.

Treatment.—Saline purgatives, Dover's powder, from ten to fifteen grains at night, and the application of a collyrium of sul-

phate of copper, or zinc, one or two grains to an ounce of rose-water, or what is probably better, steaming the eye over a decoction of poppy-heads, which will generally suffice for the cure: if these means fail, and the inflammation persist, then they should be aided by the application of cups or leeches to the temple or behind the ear, followed by blisters.

RHEUMATIC OPHTHALMIA, OR SCLEROTITIS.—*Seat.*—The sclerotica is the tissue principally affected; the inflammation of this membrane may extend on the one hand to the conjunctiva, on the other to the cornea, to the serous fold of the iris, and to the fibro-serous tissues of the eye.

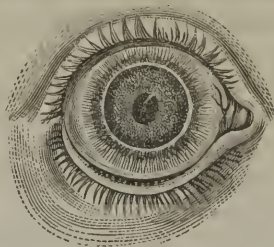
Diagnosis.—Anatomical Symptoms.—In the Conjunctiva.—The conjunctiva is injected only when the rheumatic ophthalmia is complicated with catarrhal. In the latter case we see in the conjunctiva around the corneal circumference, a vascular zone, com-



posed of vessels parallel to those of the sclerotica, which will be described below. The vessels situated in the conjunctiva are distinguished from those of the sclerotica by being more superficial, by being displaced by the movements of the eyelids, or the movement of the finger placed upon the conjunctiva, by being of larger calibre, and by communicating with other vessels coming from the palpebral conjunctiva.

The Sclerotica.—Rheumatismal ophthalmia presents a vascular zone, composed of vessels of a rose-carmine colour, straight and disposed parallel to each other, which commence at the point where the sclerotica joins the cornea, depart from this latter mem-

brane, becoming finer and finer, and terminate about a line from the corneal circumference. These vessels are situated beneath the



conjunctiva, and are only displaced by motion of the globe of the eye; they form around the cornea a crown similar to that of a radiated flower. Often some of the points of these vessels nearest to the cornea, pass the border of this membrane one-eighth or one-fourth of a line, sometimes half a line, forming upon the confines of the cornea a small circle, or oftener a segment of a vascular circle, very narrow, which constitutes one of the differential signs of rheumatismal scleritis.

The Cornea.—In rheumatismal ophthalmia there frequently forms, without the vessels of the sclerotica being prolonged on the corneal conjunctiva, a transparent phlycten, about the size of a millet seed, or at most that of a lentil. This phlycten, by bursting, gives rise to a small superficial ulceration; the base remains clear and transparent, which cicatrizing, leaves in its place a facet similar to that of a cut diamond.

Rheumatic inflammation may affect the deep-seated laminæ of the cornea. This membrane becomes as if sanded over and dotted with fine points; these soon form in the cornea opaque patches of a white or slightly bluish tinge, which are due to infiltration of a fibro-albuminous matter between the laminæ of this membrane.

The Iris.—Rheumatismal ophthalmia may be transmitted to the sclerotica, to the membrane of the aqueous humour, to the serous lamina which covers the anterior surface of the iris, and even to the parenchyma of this membrane. There exists, then, besides

the anatomical characters of sclerotitis, a constriction of the pupil, which becomes most frequently perpendicularly oval; the iris changes colour, and its radiated structure begins to be effaced.

Physiological symptoms.—Secretion.—the mucous secretion is not augmented as long as the rheumatismal ophthalmia is not complicated with catarrhal conjunctivitis. Rheumatismal ophthalmia is attended with epiphora, due to a veritable hyperdiacrisis, or augmentation of the lachrymal secretion; it is in harmony with the intensity of the inflammation. The tears which escape from the eyelids, at the least effort that is made to open them, are hot, burning, and sometimes corrode the skin with which they come in contact.

Pain.—The pain is lancinating, which augments when an attempt is made to separate the eyelids. This pain, sometimes confined to the ocular globe, is superficial: sometimes it is accompanied with lancinations in the temple and side of the head. It has frequent remissions, which give it a periodical character.

Photophobia.—This is violent, and is in proportion to the degree of intensity of the sclerotitis. The patient cannot open the eye in full daylight, whilst he opens it without much inconvenience in a moderate or semi-obscure light.

Vision.—As long as the rheumatismal ophthalmia remains concentrated in the sclerotica, the sight is but little or not at all impaired; but the confusion of vision becomes more considerable as soon as the cornea, the membrane of the aqueous humour, and the iris begin to be affected.

Coincidence of ocular inflammation with an affection seated in other organs.

In the train of rheumatismal ophthalmia is often found rheumatic affections of other organs. The same cause which gives rise to rheumatic affections of the eye, may at the same time have operated on some other portion of the fibrous system; whence it results, that the rheumatismal ophthalmia may then be accompanied with a catarrhal rheumatic affection of another organ.

Terminations.—Resolution, development of phlyctens on the cornea, superficial ulcerations of this membrane, in consequence of

the rupture of these phlyctens, and exudations in the pupillary opening when the iris has been affected.

Causes.—Sudden reduction of temperature, which acts upon the fibro-serous tissues of the eye. The irritation of the fibro-serous membranes, in consequence of sudden variations of atmospheric temperature, constitutes rheumatism.

Treatment.—The treatment of rheumatismal ophthalmia is conducted according to the following indications :

The antiphlogistic indication must be met with general and local bloodletting, mercurials, purgation, low diet, and superficial revulsion, by blisters of cantharides and savin ointment, or tartar emetic ointment.

The anti-rheumatic indication is fulfilled by the employment of antimonial preparations, sudorifics, colchicum, &c.

Lastly, energetic revulsion established on the skin, especially the nape of the neck, behind the ears, and high up on the temples.

ERYSIPELATOUS OPHTHALMIA.—*Seat.*—Erysipelatous ophthalmia is seated in the ocular conjunctiva, and in the subconjunctival cellular tissue. The infra-orbital cellular tissue, and that of the eyelids, may at the same time with the conjunctiva be the seat of an erysipelatous tumefaction.

Diagnosis.—*Anatomical Symptoms.*—*The Conjunctiva.*—The injection of the vessels of the conjunctiva in erysipelatous ophthalmia is confluent; the conjunctiva swells, assumes a pale reddish-yellow colour, quite uniform, becomes relaxed, is easily wrinkled, and presents the aspect of an infiltrated membrane.

The Sclerotica.—The confluent injection of the conjunctiva and the swelling of the subconjunctival cellular tissue conceal the subjacent sclerotica, and do not permit us to ascertain the condition of this membrane.

The absence of photophobia and epiphora in erysipelatous ophthalmia sometimes enables us to conclude that the sclerotica is exempt from inflammation.

The cornea, iris, and choroid preserve their integrity in this variety of ophthalmia.

Physiological Symptoms.—*Secretion.*—The mucous secretion is scarcely augmented, and there is no epiphora.

Pain.—The swelling of the ocular conjunctiva, pressing against the eyelids, occasions a disagreeable sensation of pricking or friction, and a sense of tension. There is neither *photophobia*, nor alteration in *vision*.

Coincidence of ocular inflammation with an affection seated in another organ.

Erysipelas of the conjunctiva is frequently, only the result of an extension of erysipelas of the face or eyelids to the ocular mucous membrane.

Terminations.—Resolution and œdema of the conjunctiva.

Causes.—Cold acting on persons of a bilious temperament; sometimes it is of epidemic origin.

Treatment.—The treatment of this ophthalmia consists in the following indications.

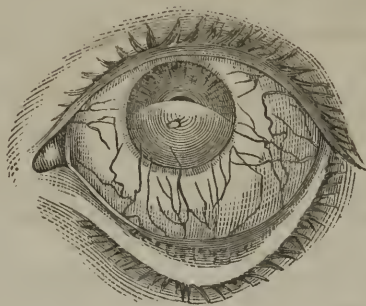
The *antiphlogistic*, which is fulfilled by administration of an emetic or purgatives, and the use of light sudorifics. When the symptoms run high, local bleeding and blistering may be called for, with warm fomentations to the eye.

The topical indications, in most cases, are answered by compresses, either simple or aromatic, over the eyelid.

VENOUS OPHTHALMIA.—*Seat.*—Venous ophthalmia (*arthritic and varicose ophthalmia* of some authors) affects simultaneously the fibro-serous and vascular tissues of the eye; consequently it is located in the conjunctiva, sclerotica, cornea, and iris, but principally in the choroid, of which the congestion or inflammation co-exists always with the inflammatory symptoms of the other membranes mentioned.

Diagnosis.—*Anatomical Symptoms.*—The *conjunctival* injection is composed of large vessels distinct one from the other, and nearly varicose, not parallel, having their trunks arranged as they run under the palpebral conjunctiva near its great fold, and ramify by bifurcation. The trunks divide into two branches, each of which subdivide into two or more ramifications; those on the edge of the circumference of the cornea in the form of arches, and go to anastomose in some places with the ramifications arising out of the other vascular trunks. In cases where the venous ophthalmia is the sequence of catarrhal ophthalmia, the injection of the con-

conjunctiva presents often only the characters of this last, with this difference, that the vessels are of a deeper colour, intermixed with



other vessels larger and more varicose; in short, that the injection is not slow to become confluent.

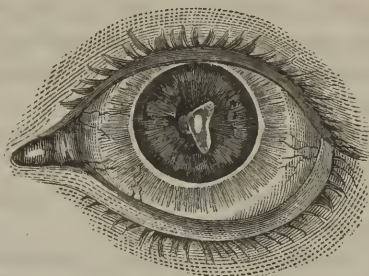
In the sclerotica there exists, in venous ophthalmia, a deeper coloured circle of vessels than those which compose the rheumatismal zone, but having the same disposition around the edge of the cornea.

The vessels which form this zone present numerous anastomoses; but that which principally characterizes the venous injection of the sclerotica, is the presence of a *bluish* or *whitish-blue* ring, more or less complete, of the width of the third of a line or less, which surrounds the cornea, and which separates the vascular zone from the circumference of this membrane, (the venous or arthritic circle.)

The Cornea.—In venous ophthalmia, the cornea becomes sometimes the seat of an interlamellar effusion, and of a very circumscribed ulceration; this is of an irregular oval form, much longer than wide: the edges have a torn appearance, and are more or less abrupt. The bottom of the ulcer is covered with a grayish matter, which, towards the period of cure, becomes pulverulent, ectaceous, chalky, or yellow.

The Iris.—When the venous ophthalmia invades the vascular tissues of the eye, the iris changes colour; the pigmentous layer seems to disappear from its posterior surface. This membrane

assumes a marbled aspect, and is spotted with patches more or less large, of a bluish or gray slate colour, sometimes a little pearly.



The iris takes a dirty tint, and loses its fibrinous structure. The pupil is dilated, immovable, and transversely or perpendicularly oval, or else this opening is contracted and irregular, on account of adhesions which are formed between its margin and the anterior crystalline membrane.

The Choroid.—Venous ophthalmia is constantly accompanied with congestion or inflammation of the choroid; it betrays itself by the varicose injection of the external membranes of the eye, the injection of which vessels anastomose with those of the ciliary body and of the choroid. The injection of the choroid manifests itself also by the presence of the venous circle around the cornea, by the alterations in the iris, and the changes in the form of the pupil, but above all by the glaucomatous appearance of the bottom of the eye, which seems to be the seat of a concave opacity of a sea-green colour.

Physiological Symptoms—Secretion.—The mucous secretion of the conjunctiva presents some peculiar characters in arthritic habits affected with ophthalmia. It is often of an acrid and corrosive nature, the mucus sometimes resembling a whitish foam, which collects in the angles or in the folds of the conjunctiva. (Arthritic foam.)

The epiphora which accompanies scleritis appears to be less violent than in rheumatic ophthalmia.

Pain.—At the commencement there are sensations of icy cold-

ness, numbness in the forehead, eyelids, the surface of the eye, and in the corresponding side of the head. Sometimes there are illusory sensations of a hair, a thread, or of a spider's web, touching superficially the forehead and eyelids. In the period of the greatest intensity, there is a boring and lancinating pain, occupying the bottom of the orbit and suborbital region, radiating to the temple, the occiput, and the cheek.

The pains are remittent, and especially exasperated towards night; they are often accompanied with photopsys.

Photophobia exists when there is scleritis, but is less violent than in rheumatic scleritis.

Vision may remain clear as long as the venous ophthalmia spreads not far beyond the conjunctiva; but as the venous circle forms around the cornea, and the bottom of the eye becomes greenish, the sight is covered as if by gauze,—a mist which becomes more and more dense, and which may terminate in complete blindness.

Causes.—Venous ophthalmia is always preceded or accompanied by derangement in the functions of the abdominal viscera, gouty pains, irregular hæmorrhoids, anomalies, or cessation of the menstrual fluxes, and a cerebro-ocular congestion, depending upon a disturbance in the circulation.

Terminations.—Resolution, deep ulceration of the cornea and its consequences, when this membrane is perforated; glaucoma, and by that, complete blindness, degeneration, and staphyloma of the choroid. In the case of iritis, there may be exudation in the pupil, and often obliteration of this opening.

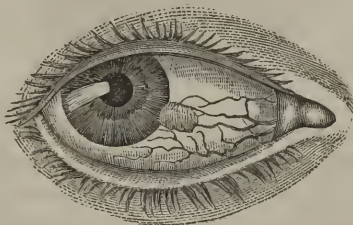
Treatment.—There are two principal indications in this disease; namely, the antiphlogistic, and the venous congestion. The treatment should be directed to the removal of the cause of the disease. The antiphlogistic indications should be met promptly and forcibly, aided by the external and internal use of narcotics, to diminish the pain and sensibility of the retina.

The indication to regulate the venous circulation, and to stimulate the secretions of the abdominal viscera, should be met by revulsive bleedings, aloetics, sulphur, emmenagogues, and by the means known under the name of anti-arthritic. In the advanced

period of ophthalmia, setons, which in the early stages are injurious, become eminently useful towards its decline, and accelerate the progress of cure and prevent relapse.

SCROFULOUS OPHTHALMIA.—*Seat.*—The sclerotic conjunctiva is the tissue where scrofulous ophthalmia fixes itself, but it may affect at the same time the sclerotica, cornea, iris, and the choroid above all, when it is complicated.

Diagnosis.—*Anatomical Symptoms.*—*The Conjunctiva.*—The injection of the sclerotic conjunctiva is partial, and composed of a small number of vessels nearly parallel, reunited in fasciculi or bundles, which occupy a circumscribed part of the sclerotic conjunctiva. These vessels terminate abruptly near the edge of



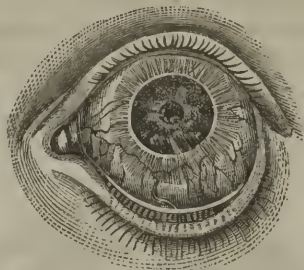
the cornea without going beyond it. The injection occupies, in the majority of cases, that part of the conjunctiva which borders upon the commissures of the eyelids.

In cases where the lymphatic ophthalmia is complicated with catarrhal ophthalmia, the vascular plexus, although always partial, is composed of two layers of vessels, the one occupying the conjunctiva, the other the cellular tissue under the conjunctiva. The vessels are one upon the other, so as to form a network of irregular squares or meshes; some between these are large, of a violet red, and united into fasciculi like those which constitute the simple scrofulous injection; others cross the first, of a cinnabar red, and are continuous with the vessels situated in the palpebral conjunctiva.

The Sclerotica is often affected in individuals attacked with scrofulous ophthalmia, but in this case it is no longer simple. It

presents then other characters than those of rheumatismal scleritis. The lymphatic ophthalmia which is accompanied by scleritis, is only a combination with rheumatic ophthalmia.

The Cornea may be affected in different ways in scrofulous ophthalmia. It may be non-vascular or primitive keratitis; then the entire cornea or a part of this membranc becomes clouded, its surface unequal, sandy, and dotted with a number of extremely



fine points; at other times the alterations of the cornea consist of inter-lamellar infiltration of lymphatic matter, which elevates the superficial layers of this membrane in the form of pustules; these are the consequences of a rheumatic complication, and have been described under the name of scrofulous rheumatic ophthalmia. Finally, in the scrofulo-catarrhal combination, the vessels of the sclerotic conjunctiva may continue on the conjunctival layer of the cornea, where they often assume the same fascicular form, which is peculiar to the lymphatic injection of the sclerotic conjunctiva.



The Iris may be affected in scrofulous ophthalmia. This membrane changes sometimes in colour as well as in texture, and exu-

dations may form in the pupillary opening. However, we do not know the particular symptoms, excepting the characters already announced, of scrofulous ophthalmia, which may serve to distinguish this species of iritis from others.

The Choroid, like the iris, may be affected in some rare cases where scrofulous ophthalmia extends itself beyond the external membranes of the eye.

It is generally the anterior part of the choroid which is the seat of scrofulous inflammation. The anatomical symptoms by which it manifests itself are those which have been indicated in the general description of choroiditis.

Physiological Symptoms.—Secretion.—The mucous secretion of the conjunctiva is not augmented in simple lymphatic conjunctivitis. The dried mucosities which, in lymphatic individuals, are often found collected under the borders of the eyelids, arise either from the complication of lymphatic conjunctivitis with catarrhal ophthalmia, (catarrho-lymphatic ophthalmia,) or from purulent glandular ophthalmia with augmented secretion of the ciliary follicles. Scrofulous ophthalmia is accompanied with a flow of tears only in cases where it is complicated with rheumatic scleritis, (scrofulous rheumatic ophthalmia.)

Pain.—Simple scrofulous conjunctivitis is not accompanied with pain. It is only in its complications with catarrhal or rheumatismal ophthalmia that we meet with the painful sensations which accompany these last varieties of ophthalmia.

Photophobia.—Whenever scrofulous ophthalmia is accompanied with photophobia and spasm of the eyelid, we observe traces, more or less evident, of rheumatic scleritis accompanying it.

Vision.—In scrofulous ophthalmia the sight is not affected; it begins to be clouded only. When the cornea and the deep tissues of the eye become inflamed, then the trouble of vision is in harmony with the alteration produced by the phlegmasia of these tissues.

Causes.—Persons affected with scrofulous ophthalmia present a scrofulous habit. Scrofulous affections of other organs, as cutaneous eruptions, lymphatic ulcers, glandular engorgements, and affections

of the osseous system often precede scrofulous ophthalmia, and sometimes coexist with it.

Terminations.—Resolution, pustules, which form at the junction of the sclerotica with the cornea, or sometimes on this last at the extremity of vascular fasciculi, with ulcerations more or less deep at the time of the rupture of these pustules. In the case of lymphatic catarrhal ophthalmia, the pustule is formed some distance from the corneal circumference. In keratitis and scrofulo-rheumatic ophthalmia, resolution, interlamellar effusion in the cornea, onyx, ulceration in the cornea, hypopion, and leucoma.

In cases of iritis and choroiditis, there are alterations, more or less serious, of these membranes.

Treatment.—The chief indications in treatment are the anti-scrofulous or lymphatic, with the antiphlogistic.

The antiphlogistic indications are best fulfilled by depletion, purgation, mercurials, and counter-irritation.

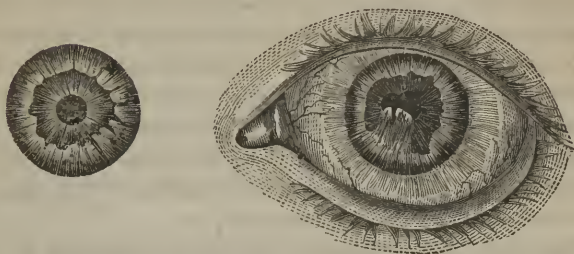
The lymphatic indication requires the employment of purgatives, mercurials, antimonials, the preparations of iodine and barytes, of alkalies, tonics,—and, above all, measures to place the patient in external conditions contrary to those which favour the development of scrofulous affections.

SYPHILITIC OPHTHALMIA.—*Seat.*—*The iris* is the only tissue of the eye affected by secondary syphilis. The propagation of syphilitic ophthalmia to other parts than the iris is almost always due to complications.

Diagnosis.—*Anatomical Symptoms.*—*The Sclerotica.*—In cases where syphilitic ophthalmia is accompanied with sclerotic injection, this last depends upon an accidental rheumatic complication. However, we find sometimes in the train of anatomical signs of syphilitic ophthalmia, a zone of violet red, from a line to a line and a half in width, of uniform tint, in which we do not observe separate vessels. This zone, that it may not be confounded with rheumatic injection, is described under the name of *dyscrasic circle*.

The Iris.—Syphilitic ophthalmia always fixes itself in the iris, under the form of inflammation of its parenchyma. The little circle of this membrane takes a livid, violet, or copper-coloured

tint; its tissue is tumefied, and forms an elevated ring, composed of thick downy flakes. The pupil becomes irregular, and often



assumes the configuration of an oblique oval form, of which the superior and internal extremity is more or less angular. It forms sometimes on the anterior surface of the iris one or several yellowish or reddish circumscribed elevations, with surfaces uneven and flocculent, which seem analogous to the condylomatous vegetations.

The Choroid.—The inflammation may transmit itself to the choroid and the retina; we as yet know of no particular symptoms by which the phlegmasia of these membranes, secondary to syphilitic iritis, differ from choroiditis and retinitis in general.

Physiological Symptoms.—*Secretion.*—When, in syphilitic iritis, there is augmentation of the mucous or lachrymal secretion, the inflammation is no longer simple; a catarrhal or rheumatismal ophthalmia, is then added to the syphilitic iritis.

Pain.—Violent pains occupy the suborbital region of the affected side, radiating sometimes to the neighbouring regions of the head; they increase during the night, have their greatest violence at midnight, and abate towards morning.

Photophobia.—Syphilitic ophthalmia, when it exists alone, exempt from complication, is never accompanied with photophobia.

Vision.—The visual faculty is more or less altered, by reason of the intensity of the inflammation and of the plastic exudations formed in the pupillary opening.

Terminations.—Resolution, condyloma of the iris, exudation in the pupil, and obliteration of this opening.

Causes.—A syphilitic affection always precedes the development of syphilitic iritis. Although sometimes occurring alone, it is more commonly accompanied by other secondary symptoms, such as eruptions of the skin, ulceration of the throat and mouth, pains in the limbs, and swelling of the periosteum. It is seen in conjunction with papular, scaly, tubercular, and pustular eruptions. As it belongs to the earlier class of secondary syphilitic affections, it sometimes shows itself, like the other symptoms of that class, before the primary disorder has been cured.

Treatment.—The treatment of syphilitic ophthalmia is based upon two principal indications, namely, the antiphlogistic, and the antisyphilitic.

The antiphlogistic indication calls for the energetic employment of sanguineous emissions, general and local, of purgatives, revulsives, frictions with mercurials, belladonna, &c.

The antisyphilitic indication must be met by the means recommended for the cure of secondary syphilis.

VARIOLOUS OPHTHALMIA.—*Seat.*—The seat of this ophthalmia is the skin of the eyelids, as well as all parts of the conjunctiva; variolous pustules may be numerous on the external surface of the eyelids, accompanied with erysipelatous swelling of these membranous coverings.

Diagnosis.—*Anatomical Symptoms.*—*The Conjunctiva.*—The variolous pustules which develop themselves in the different parts of the conjunctiva, are small, yellowish, and elevated above the level of the membrane; there is also intense injection of the external membranes.

The Sclerotica is the seat of vivid injection.

The Cornea.—If the pustules develop themselves on the cornea, this membrane becomes the seat of suppurative points, whitish at first, afterwards yellowish, which rise little by little; the suppuration is not long in affecting the substance of the cornea, taking the form of an elevated pointed pustule, or later, that of an onyx.

The Iris may be affected secondarily in variolous ophthalmia.

The Choroid.—Variolous ophthalmia extends to the deep-seated tissues of the eye, consequently to the choroid.

Physiological Symptoms.—*Secretion.*—The secretion of the ciliary follicles of the conjunctiva is augmented. The dried mucosities between the palpebral edges glue these fast together, opposing the free flow of tears.

Pain.—The eruption of the exanthema on the conjunctiva announces itself by a sensation of tension, gravel, or sand, with lancing pains under the eyelids. The pain is in proportion to the extent of surface of the ocular globe invaded by the inflammation and suppuration.

Photophobia.—Sensibility to light is very great, causing burning tears to flow from the fissures of the eyelids.

Vision.—The trouble of vision is in harmony with the violence of the inflammation, and the obscurity of the cornea.

Terminations.—Suppuration of the cornea, leaving leucoma, with or without adhesions of the iris, ulceration, staphyloma of the iris. It may terminate by the total destruction of the cornea, and even by the purulent discharge of the eye, or by chronic blepharitis and conjunctivitis. Falling of the eyelashes, trichiasis, entropion, ectropion, obliteration of the lachrymal sac and blennorrhœa ought to be named among the sequents of this ophthalmia.

Causes.—The origin of this variety of ophthalmia always depends upon contagion.

Treatment.—The prophylactic treatment consists in preventing the variolous eruption of the organ of vision by topical repercussive means, the local employment of mercurial ointment on the eyelids, the use of revulsives, and finally by the *ectrotique* method. The proceeding recommended by M. Velpeau for checking the development of the variolous pustule, consists in touching the eruption in its early stage with a strong solution of nitrate of silver, or the caustic in substance. If the effusion have already begun, the cuticle should be punctured by a needle, or snipped off with scissors before the caustic is applied. Variolous ophthalmia ought to be combated by antiphlogistic treatment, aided by means which diminish the tension of the affected parts, as emollient or cold applications to the eyelids, &c.

GONORRHŒAL OPHTHALMIA.—Gonorrhœal ophthalmia consists in a violent inflammation of the mucous membrane of the eyeball and lids, attended with a profuse discharge of fluid, closely resembling in all its sensible characters that which issues from the inflamed urethra in gonorrhœa, and occurring in some kind of connexion with that complaint, probably sometimes by metastasis, certainly by inoculation. It is the most violent and rapidly destructive inflammation to which the eye is subject; fortunately, it is comparatively rare. It often destroys the eye within a very short space of time, the organ frequently being irreparably injured before the patient seeks relief.

Three distinct forms of ophthalmic inflammation occur in conjunction with or dependent on gonorrhœa: namely, *Acute inflammation of the conjunctiva*, *Mild inflammation of that membrane*, and *Inflammation of the sclerotic coat*, sometimes extending to the iris.

Diagnosis.—This affection is characterized by the greatest degree of vascular congestion, the most intense and general external redness, excesssive tumefaction of the conjunctiva, chemosis, with corresponding swelling of the palpebræ, and a profuse yellow discharge. In the first stage of the disease, which is short, the inflammation is confined to the conjunctiva; it is attended with soreness, stiffness, a sensation of dirt or sand in the eye, and with more or less uneasiness on exposure to light. The disease soon extends to the cornea, with severe and agonizing pain in the globe of the eye, orbit, or head, augmented to intolerable suffering on exposure to light, accompanied with febrile disturbance of the system of an inflammatory character. The danger to the organ is now imminent. When the disease has advanced from the mucous membrane to the globe itself, there is no treatment that can avert entirely its destructive consequences. The tumefaction of the orbicular conjunctiva is often so great that it overlaps the cornea, so as nearly to hide it from view. Similar effusion takes place in the cellular tissue of the eyelids, particularly the upper, which hangs over, sometimes completely hiding the lower lid. The chemosis and swelling of the lids make it often difficult and sometimes impossible to get a clear view of the

cornea. The œdema of the eyelids declines in the progress of the affection, and then one or both may become everted, the convex edge of the tarsal cartilage being pushed forward by the swollen conjunctiva.

The effusion may be either fibrinous or serous, the tumefaction being firmer in the former, more yielding in the latter instance. Fibrine is effused when the highest inflammatory action exists in a strong subject; serum, when the inflammation is less violent, and the constitution weaker.

Effects of Gonorrhœal Ophthalmia.—The immediate effects of the inflammation on the cornea are sloughing, suppuration, ulceration, and interstitial deposition; while the consequences to which these changes lead more remotely, are escape of the humours and collapse of the globe, obliteration of the anterior chamber and flattening of the front of the eye, staphyloma, prolapsus iridis, obliteration of the pupil, corneal opacity, and anterior adhesion of the iris.

Prognosis.—Sight in a large proportion of these cases, is either lost or seriously injured. Our prognosis must principally turn on the state of the cornea; if that should possess its natural clearness, the eye may be saved. Sight may be restored after a partial sloughing of the cornea; extensive ulceration may also occur in its circumference without injury to vision.

The inflammation is not equally violent in all cases; the prognosis will be less serious in proportion to its comparative mildness.

Treatment.—In the early stages of the disease, the treatment should be actively antiphlogistic; general and topical bleeding must be pushed to the extent of the patient's capacity to bear these remedies: the lid must then be everted and the conjunctiva freely touched with the nitrate of silver and washed with tepid water; cold water should be constantly applied to the eye, and the bowels kept freely open: a solution of nitrate of silver, from \mathfrak{Hj} to \mathfrak{Hij} to the ounce of distilled water, should be dropped into the eye daily, until the purulent discharge diminishes, when it should be gradually diluted. Bringing the system under the influence of mercury is recommended by some authors, and with good reason; whatever

is done in the active stages of this ophthalmia, must be done promptly and with vigour, or the time to act will be lost. After extensive sloughing of the eye has occurred in debilitated constitutions, such active means must not be resorted to; tonics with mild astringent and emollient applications to the eye may do better: blisters are useful after the first violence of the inflammation has passed, to terminate by counter-irritation the lingering inflammatory disposition. Ulcer of the cornea, as well as other effects resulting from this inflammation, must, be treated according to the principles given for such cases.

GRANULATIONS OF THE PALPEBRAL CONJUNCTIVA.—This is a very common affection, resulting from inflammation of the conjunctiva. The conjunctiva of the upper lid is mostly the seat of these little granular tumours, which are sometimes soft and spongy,



at other times they are found to be quite firm, almost cartilaginous. They create irritation and inflammation of the eye, and opacity of the cornea. This state of the conjunctiva is exceedingly troublesome, and apt to recur.

Treatment.—Inflammation must be combated by appropriate means before the granulations of the lid are attended to. The lids should then be turned out, and if the conjunctival vessels be congested and the granulations soft, great benefit will arise from free scarification of the palpebral conjunctiva and tumours; the bleeding should be encouraged by tepid water: in most cases the daily

application of the sulphate of copper in substance to the granulations will suffice for a cure: if this fail the nitrate of silver should be freely applied to the tumours: it may sometimes be found useful to remove the granulations at once by the application of a knife or curved scissors; applying an escharotic to repress their rising again. If all these means fail, which is sometimes the case, then I have found benefit arise from the application of the caustic potassa to the granulated surface: this powerful caustic should be used with care; the lid being everted, the eye should be closed, the surface of the lid, as in the other cases, wiped with a piece of lint, and the caustic applied; when the surgeon thinks the action has proceeded sufficiently far in its work of destruction, it must be immediately arrested by decomposing the potassa with vinegar or pure acetic acid, which can be done in an instant: the lid and surrounding parts should be well washed with tepid water; the lid may then be returned. This application is decidedly less painful than that of the nitrate of silver: when the granulations are hard and unyielding, it is more efficacious than any other, and when properly applied is perfectly safe.

During the treatment of this affection, counter-irritation, by a blister to the nape of the neck, temple, or behind the ear, is a useful auxiliary.

PSOROPHTHALMIA.—This consists in an inflammation or ulceration of the eyelids, which may be the sequence of small-pox, measles, erysipelas, styes, or it may arise from an unknown cause. Scrofulous children are particularly liable to it.

Diagnosis.—The inflammation first appears on the edges of the lids, thence extends along the conjunctiva towards the globe of the eye, attended with intolerable itching, redness, and sometimes severe pain. The inflammatory action may terminate in suppuration, followed by ulceration of the tarsi, creating frequently great deformity. The Meibomian glands are always more or less affected, secreting an adhesive fluid, which glues the lids together during sleep, causing the cilia to be plucked out, and small crusts or scabs to form along the tarsi. In bad chronic cases, the puncta lachrymalia are sometimes obliterated, incurable *epiphora* being produced.

Treatment.—When the inflammation runs high, antiphlogistic means must be resorted to, as purgatives, leeches and blisters to the temples or behind the ears, cold applications to the eyes, and low diet.

Although the inflammatory action does not often prove active, yet leeches, cold applications, purgatives, and counter-irritation are useful in every stage of the diseased action. Collyria of acetate of lead, sulphate of zinc or copper, one or two grains to the ounce of rose water, or the infusion or decoction of the pith of sassafras, alum curd, or mercurial ointment, are all useful in the chronic stage of the disease, aided by blisters behind the ear or to the nape of the neck. This disease is prone to become chronic, proving excessively troublesome and difficult to cure. In stubborn cases, the best mode of treatment is counter-irritation, a mild course of mercury, and touching the diseased tarsi with the nitrate of silver, in substance or in strong solution, once or twice a week, aided by the daily application of citrine ointment.

PTERYGIUM, OR EYE-WING, is a thin, triangular, membranous expansion, seated upon the conjunctiva, generally occupying the inner angle of the eye, with its apex towards the cornea. It is a very common affection, producing no inconvenience so long as it does not encroach upon the cornea. It is a singular fact, that pterygium scarce ever passes beyond the centre of the cornea. Sometimes this disease originates in each angle of the eye, and by approaching from opposite sides, may entirely cover the surface of the cornea, thus producing blindness, the disease being then called *pannus*.

There are two varieties of pterygium,—the *membranous* and *fleshy*.

Treatment.—Pterygium should not be interfered with, unless it encroach upon the cornea, threatening to obscure vision. This being the case, the only means of arresting it is by operation. There are two modes of operating for pterygium. One consists (the lids in both cases being separated by the fingers or speculum) in elevating the thickened tissue by means of small forceps, then dissecting it all or in part away by scissors or knife. The second operation consists in elevating the pterygium, as in the former

case, and passing a knife or scissors perpendicularly through it, thus dividing it into two parts by the incision; then passing the sharp point of a pencil of nitrate of silver along the incision, to cauterize the cut surfaces, thus preventing reunion: the thickened membrane is then absorbed, or at least the advance of its growth over the cornea is arrested. Cold or tepid applications must be made to the eye after both operations, to avoid inflammation.

ENCANTHIS.—This signifies an enlargement of the caruncula lacrymalis; it is the result of inflammation. There are two forms of the disease, viz., the innocent and malignant: the latter is exceedingly rare.

Treatment.—For the former, the application of astringent collyria will generally suffice: should these fail, repeated applications of leeches and blisters must be resorted to. For the malignant disease, nothing but extirpation will effect a cure.

OPACITY OF THE CORNEA is generally the result of inflammation: new matter deposited becomes organized, thus causing the opaque change.

The edge of the cornea frequently loses its transparency in elderly persons; the opaque circle or half-circle thus formed is called *arcus senilis*, or *gerontoxon*: it comes on without the patient being aware of it, until at length it renders the cornea impervious to light in the part which it occupies. In some cases the circle is very narrow; in others, much broader: there is generally a comparatively transparent rim between it and the sclerotic coat.

Opacity, in its slighter form, is called *nebula*, haziness, or dullness; there is a milky, cloudy, or smoky appearance of the part; a state in which the transmission of light is only partially impeded.

The more dense opacities, extending through the laminæ, are called *leucoma* or *albugo*; which, according to Mr. Lawrence, are one and the same. The term *macula* is applied to small patches or specks.

Opacity may be confined to the external or mucous layer; it may be seated in the corneal substance, or in the internal serous

membrane, or it may extend through the whole texture. Opaque change of the corneal laminæ may vary from slight nebula to dense leucoma; and opacity of the entire structure may vary in the same way.

Treatment.—The first object is to check inflammation; this being done, and time allowed, the absorbents will generally remove the opacity. If the action be arrested, or go on too slowly, it may be assisted by counter-irritation, diet, regulation of the bowels, and the use of astringent and stimulating collyria, as the nitrate of silver, one or two grains to the ounce of water, gradually increased in strength; this may either be dropped into the eye, or applied to the opaque part, by means of a hair pencil; or the bichloride of mercury may be used in the same way, or dilute tincture of opium; it is a good rule to vary these applications, using each about a week at a time.

Where the opacity is very white and dense, partial relief only is effected, complete cure being extremely rare in such cases.

The third case, which does not admit of cure, is the firm white shining cicatrix of wounds or ulcers. When an ulcer is superficial, like an excoriation, it may leave no trace; it is only when it has extended into the corneal laminæ, that the cicatrix becomes a permanent white mark. A cicatrix may be recognised by its sharply defined margin, and shining appearance; whilst the edge of an opacity produced by an interstitial deposit is gradually shaded off.

ULCER OF THE CORNEA.—Ulceration of the cornea is an effect of inflammation, especially in purulent and strumous ophthalmia.

Ulcers of the cornea may be small or large, superficial, and confined to the conjunctival layer, or deeper, affecting the corneal texture, or even penetrating the anterior chamber; they may be inflamed and spreading, stationary or healing.

In the superficial ulcer there is a mere removal of the thin conjunctival layer, producing an appearance of excoriation in the integuments.

When the loss of substance extends more deeply, the excavation is more or less funnel-shaped.

The figure of the ulcer may be regular or irregular, its surface and edges smooth or unequal.

Diagnosis.—When the ulcer is stationary, the affected part has its natural transparency; if it be small it may be difficult to discover it, but by placing the eye so that the light shall fall on the part, the inequality of surface is soon recognised. It is sometimes seen as a small round or oval dimple, appearing as if a small bit had been shaved off with a knife. Sometimes there is an ash-coloured slough covering the surface of the corneal ulcer. There is often severe pain attending this affection.

Treatment.—If inflammation exist, the same treatment should be employed as if there were no attending ulceration; and generally by arresting the inflammatory process, the ulcer is cured.

When the ulcer is healing, the best course is to leave the case to nature, merely employing tepid ablution.

To arrest the progress of ulceration, and to promote granulation, it is necessary to use collyria of sulphate of copper, zinc, or nitrate of silver, commencing with two grains to the ounce of water. Or apply the nitrate of silver in substance to the ulcerated spots once every twenty-four hours, until the ulcer assumes a healthy appearance.

STAPHYLOMA signifies an opacity of the cornea. It may be either *partial*, transmitting a few rays of light, or *total*, being wholly opaque.

It is also called according to the form assumed by the cornea—*staphyloma hemisphericum*, *globosum*, *conicum*, and *racemosum*, resembling a bunch of small grapes.

Causes.—Small-pox, purulent ophthalmia, wounds of the eye, blows, and other injuries.

Treatment.—This is either *palliative* or *radical*; but neither mode of treatment diminishes the opacity of the cornea.

The *palliative* treatment consists in removing the inflammation by the means already directed for this purpose, and diminishing the volume of the swelling by puncturing the cornea with a cataract knife or needle.

The *radical* cure consists in the removal of the staphylomatous protuberance, causing subsequent collapse of the eye. The opera-

tion is performed by separating the lids with the aid of an assistant, transfixing the staphyloma with a hook, and passing a knife through its base from above downwards, a little in front of the sclerotica, and removing it at one cut. Or the knife may be passed through its middle, cutting out, and then dividing the remaining half with scissors. All pressure upon the globe of the eye should be avoided, so as not to evacuate its contents; if this be done, the globe shrinks so much that there is scarcely stump enough to fit an artificial eye upon.

HYPOPION.—The term *hypopion* or *hypopium* designates the presence in the anterior chamber of a yellow pus. When matter is effused behind the iris, as well as in front, it is called *empyesis oculi*.

Causes.—It is always the result of inflammation, the hypopion being produced by the bursting of a corneal abscess, abscess of the iris, inflammation of the internal tunics, or by general inflammation of the globe, the circumstances common to the latter affections leading to the occurrence of hypopion, being inflammation of the membrane lining the chambers of the aqueous humour.

Diagnosis.—The matter of hypopion, being heavier than the aqueous humour, sinks to the bottom of the chamber; its superior surface is horizontal, whilst the inferior boundary, formed by the margin of the cornea, is crescent-shaped. But sometimes the upper line is not level; the matter is in lumps, appearing heaped up.

Treatment.—This affection must be treated on the same principles as other ophthalmiæ. We must depend principally on antiphlogistic treatment and the use of mercury, for preventing the occurrence or arresting the progress of hypopion. After the inflammation is arrested, the matter is gradually absorbed.

HYDROPTHALMIA.—This is a partial or general enlargement of the globe of the eye, caused by increase in the quantity of the humours, or by effusion of an aqueous fluid. The affection is called *dropsy of the eye*, *hydrops oculi*, *hydrophthalmia*, *hydrophthalmus*. Authors have divided it into three kinds:—dropsy of the cavities containing the aqueous humour, *hydrops cameræ anterioris*; dropsy of the vitreous humour, *hydrops corporis vitrei*; and general dropsy of the eyeball, *hydrophthalmia*.

Of this disease Scarpa says: "The generality of surgeons teach that the immediate cause of the dropsy of the eye is sometimes the increase of the vitreous, at other times of the aqueous humour. In all the cases of dropsy of the eye which I have operated upon, or have examined in the dead body, in different stages of the disease, I have constantly found the vitreous humour, accordingly as the disease was inveterate or recent, more or less disorganized, and in a state of dissolution; nor have I been able in any instance to distinguish, on account of the increased quantity, which of these two humours, vitreous or aqueous, had the greater share in the formation of the disease."

Diagnosis.—In hydrops oculi the cornea is partially or generally opaque; the external tunics are distended and rendered thinner; the part of the large globe, which sometimes protrudes between the lids, is often irregularly protuberant. The interior is usually filled with aqueous fluid. This state of the globe is attended with the same inconveniences as staphyloma, and accompanied with equal or greater deformity. By its enlargement, irregular figure, and unusual protrusion, it causes irritation of the lids, or experiences mechanical irritation from them; consequently the inflammation thus excited irritates and weakens the sound eye.

Causes.—This condition of the eye results from changes of structure caused by serious and long-continued inflammation, such as the strumous, variolous, and purulent ophthalmia.

Treatment.—This is palliative or radical; where inflammation exists, it should be reduced by appropriate antiphlogistic means.

When the enlargement of the globe is so great as to cause serious inconvenience, it should be palliated by evacuating part of the fluid by puncture of the cornea or sclerotica. By repeating this proceeding, a sufficient diminution of the enlarged globe may be produced.

If this treatment do not succeed, the operation for the radical cure of staphyloma must be performed: the after deformity may be remedied by an artificial eye.

OBLITERATED PUPIL.—Closure of the pupil of the eye, either perfect or imperfect, is caused by *iritis*, which results in the effusion of fibrine, which becomes organized, and forms an opaque

adventitious membrane, adherent to the cornea or capsule of the crystalline lens, and to the pupil.

Diagnosis.—If the effusion should have occupied the pupil and margin of the iris only partially, the adventitious membrane will be found towards one side, not in the centre, the edge of the pupil being fixed to it, and thus drawn out of its regular line, while the rest of the opening is natural. This imperfect closure of the pupil, *atresia iridis imperfecta*, is attended with greater or less injury to sight. Although the patient may have no useful vision when the aperture is contracted, he may be able even to read if a little enlargement can be procured by the influence of belladonna.

When considerable effusion has taken place into the posterior chamber, it is organized into a dense opaque substance, to which the entire circumference of the pupil is closely fixed, the opening itself being greatly contracted or actually shut, and sometimes removed more or less from the centre of the iris. By this complete closure of the pupil, *atresia iridis perfecta*, the communication between the two chambers is destroyed, whilst the passage of light into the eye is almost intercepted, being accompanied with a corresponding loss of sight. By means of the adventitious membrane thus produced, the uvea may be rendered generally adherent to the crystalline capsule; yet there may be a free anterior chamber, or the iris may have been previously pushed forwards in contact with the cornea, and lessen or destroy the anterior chamber.

Treatment.—The principal objects of treatment are to arrest inflammation, to prevent the further effusion of lymph, and to promote absorption; the contraction of the pupil should be prevented, if possible, by antiphlogistic means, the administration of mercury, and the use of belladonna. If these fail, and the pupil be obliterated, then it becomes necessary to form an *artificial* pupil by operation.

There are two operations practised for the relief of this deformity.

One consists in passing the artificial pupil knife through the sclerotica about one line from its corneal edge, carrying it through the iris, cutting this partition in the line of its transverse diameter

as the knife is withdrawn; if the division be sufficient, the radiated fibres immediately contract, forming an opening of large size.

The other operation consists in making a section of the *cornea*, and removing a portion of the iris by means of scissors. After the operation, the eye should be closed, and the patient kept quiet in bed.

PROCIDENTIA IRIDIS.—This signifies a protrusion of the iris through the cornea, caused by wound or ulcer of this membrane.

Diagnosis.—Severe pain, intolerance of light, abnormal shape of the pupil, being generally oval. Sometimes there are two or three projections of the iris, each of which passes through a distinct opening in the cornea. If protrusion have continued for a long time, adhesion is apt to take place between the cornea and iris, the projecting part of the iris becomes dry, hard, and sometimes sloughs away.

Treatment.—If the disease arise from a wound of the cornea, the iris must be replaced, and the wound brought together. But when the procidentia depends upon ulceration of the cornea, it is impossible to replace the iris and retain it there until the ulcer is healed. The treatment must, therefore, be directed to the cure of the ulcer. This is most readily effected by touching it with nitrate of silver, and reducing the inflammation that may exist by appropriate means.

CATARACT.—Cataract is a partial or general opacity of the *crystalline lens*, of its *capsule*, or of the *Morgagnian fluid*, separately or conjointly, with a corresponding diminution of sight. Cataract is usually formed slowly, requiring some weeks, months, or years for its complete development. It may, however, come on in a few hours. It seldom destroys sight completely, even when fully developed. In many forms of the disease, a considerable degree of vision remains; in the worst cases, the patient can distinguish light from darkness, if the retina be sound.

It may appear in one eye, or in both. In the former case, the second eye is generally affected sooner or later. In a few instances, the complaint is confined to one eye.

There are *four varieties* of cataract: the *lenticular*, *capsular*, *Morgagnian*, and the *capsulo-lenticular*.

Diagnosis.—The colour of the opacity in cataract is gray, varying from milk-white or bluish-white, to yellowish-brown, or amber colour. The opacity of the pupil in glaucoma is green, a dull green, or yellowish-green. Incipient cataract sometimes exhibits a similar tint, so that the mere circumstance of colour is not sufficient to establish the diagnosis between these two affections. But in cataract the opacity is near the pupil, often immediately behind it; in glaucoma and amaurosis, the discoloration is more deeply seated, appearing as if it were at the bottom of the eye. Hence, if the eye be viewed laterally in glaucoma, the opacity is lost sight of, which is not the case in cataract. The opacity in glaucoma has generally a concave appearance, in cataract it is convex.

In cataract, the opacity generally begins in the centre of the pupil, extending to the circumference; consequently, vision is better when the pupil is dilated, either by artificial means, or by turning the back to the light. These circumstances distinguish cataract from glaucoma and amaurosis; for in the latter affections, the sensibility of the retina being impaired, the individual sees better in strong light, his sight is not improved by dilatation of the pupil, consequently, he sees better when looking towards the light.

In cataract, objects appear as if surrounded by fog or mist; there is irregularity, distortion, multiplication of objects, and confusion of sight; a lighted candle appears in a cloud; but in amaurosis, the flame of a candle appears scattered in rays like a star, surrounded by a halo or confused with prismatic colours. The sensibility of the iris and form of the pupil are not affected in cataract; in amaurosis and glaucoma the pupil is more or less dilated, the iris motionless or sluggish, and the pupil not perfectly round, being sometimes angular.

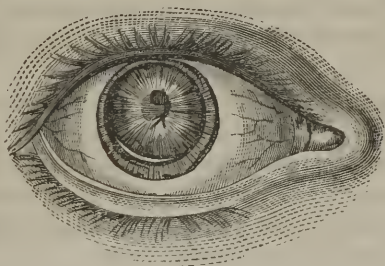
Cataract forms without sensations of uneasiness in the eye; it has been completely developed in one eye without the patient being aware of its existence.

The *catoptric* examination of the eye affords the most unerring diagnostic signs of cataract.

In the early stages of lenticular cataract, the brilliancy and distinctness of the inverted image is diminished; it has no longer a

well-defined margin, but its outline appears shaded off. This image gradually fades with the increase of the opacity, and long before the cataract is mature, the inverted image is obliterated. The deep erect image is also indistinct in the advanced stages, the anterior surface of the capsule giving only a general reflection. In capsulo-lenticular cataract, the inverted image fades much earlier than in the mere lenticular cataract, a very slight degree of opacity of the capsule sufficing to destroy its function of reflection.

Lenticular Cataract is generally *hard* or *firm*, *cataract dura vel tenax*. The lens is grayish, yellowish-brown, or amber-coloured; of darker tint in the centre than circumference. The darker the colour, the harder the cataract; the grayer its appearance, the softer its consistence. Lenticular cataract is sometimes *radiated*; the opacity appearing in streaks or radii, with the intervals comparatively transparent, the radii generally beginning in the circumference of the lens,—the reverse of the ordinary form of opacity, which begins in the centre.

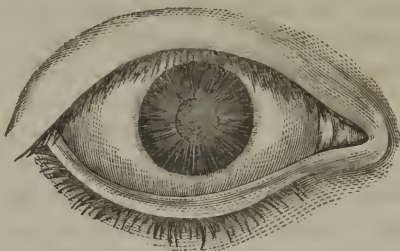


The lens, in hard cataract, has about the consistency and hardness of yellow wax, with a firm nucleus, the lens being generally smaller than natural, appearing but a small distance behind the pupil, the capsule being unaffected.

Soft Cataract has various degrees of consistence: the whole texture of the lens is changed, and may resemble cheese (*cataract caseosa*), jelly (*cataract gelatinosa*), or milk (*cataract fluida vel lactea*).

Soft cataracts are larger than the hard; pushing against the

iris, making its anterior surface convex, thus interfering with its motions. Soft cataracts are *gray*, *grayish-white*, *bluish-white*, or *milky*, without any mixture of the yellow or amber colour. The opacity is not uniform, but presents a streaked, cloudy appearance,



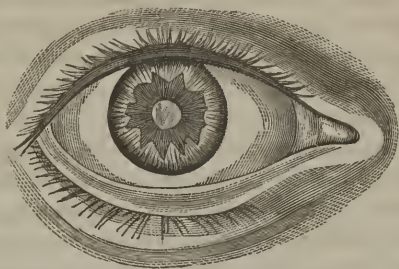
especially in the beginning, so that we can see into and almost through the lens. It is equally diffused through the latter; the discoloration is consequently equal in the whole pupil. It intercepts the light more completely than hard cataract; the patient at last retaining merely the power of distinguishing light from darkness.

Morgagnian Cataract signifies opacity of the fluid situated between the lens and its capsule. The existence of this variety of cataract, in a distinct form, is doubted by some authors and maintained by others. It is hardly possible for it to exist alone more than a brief space of time, if at all; it is not, therefore, necessary to consider it as a distinct form of cataract.

Capsular Cataract.—This has been divided into *anterior*, *posterior*, and *complete*, according to the part affected. Capsular cataract does not begin in the centre, but indifferently in any part of the membrane: it is not uniform, being in spots or streaks, with less opaque or transparent intervals: the opaque portions are of a glistening, chalky, or pearl white, giving a different character to the opacity of the jelly-like substance of the lens.

Anterior capsular cataract is on a level with the pupillary margin of the iris, sometimes passing into the aperture. The capsule cannot become extensively opaque without the lens also being affected.

The *posterior* part of the *capsule* may become opaque, the anterior portion and lens remaining transparent ; in this case, there is an opacity situated at a marked distance behind the pupil : its



situation corresponds to the known position of the capsule. It can be perceived that it presents a concave surface, this deep-seated concave opacity being in partial streaks, the intervals of which are transparent.

Posterior capsular cataract has not that glistening white colour which distinguishes the anterior ; because it is seen through the lens, thus acquiring a yellowish and rather dull appearance. The patient can see much better when the eye is shaded, or when the pupil is artificially dilated. When opacity of the lens commences, which may not be for two, three, or more years, vision is more seriously impaired.

Complete capsular cataract cannot be easily ascertained : if the anterior portion of the membrane be opaque, it will prevent us from knowing whether the posterior be so or not. With a slight opacity of the anterior, it may be practicable to see also the opaque posterior part of the capsule : but the lens will participate in the affection, and the case may be considered as a capsulo-lenticular cataract.

Capsulo-lenticular Cataract is a frequent form of the disease ; it is sometimes caused by a chronic and almost insensible inflammation or at least determination of blood to the eye, accompanied frequently with symptoms of congestion of the head, with *muscæ* or flashes of light and some degree of intolerance. Under this disturbance of the circulation the colour of the iris is

sometimes altered, the capsule undergoing changes from interstitial deposition, or from effusion of lymph on its surface, which leads to peculiar subsequent appearances. These vary greatly in different instances, and have been named as if they were so many distinct species of cataract; as *cataract marmoracea* or *variegata*, having a marbled appearance; *cataract fenestrata*, with bars like a window; *cataract streata*, streaked cataract; *cataract stellata*; *cataract punctata*, with spots on the capsule and so on.

Causes.—Congenital, wounds, inflammation; but the cause of cataract in many instances is entirely unknown and unaccountable, for it arises and progresses without any apparent cause; nor can the congenital form be explained from the two great causes of membranous thickening, viz. :—traumatic and idiopathic inflammation.

Prognosis.—This is favourable when the affection is confined to the lens or capsule, and when the sensibility of the retina is undiminished, the motions of the iris being unimpaired: also when the constitution of the patient is sound and health good. The prognosis is particularly favourable in congenital cataracts in young persons, as well as in the firm lenticular cataract of elderly people.

It is unfavourable when the cataract is complicated with glaucoma or amaurosis, with a fluid state of the vitreous humour, or a varicose condition of the blood-vessels; with dropsy of the eye, or a contracted or closed pupil.

It is also unfavourable when the cataract has been preceded or accompanied by severe pains in the head or in the eye, by sparks or flashes of fire before the eye; since these circumstances indicate affection of the nervous structure.

The prospect is doubtful when cataract is the result of internal inflammation of the eye, or of that vascular disturbance which comes under the head of congestion.

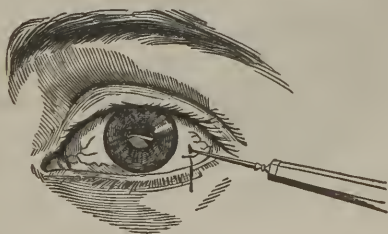
The prognosis is doubtful also in cases of cataract affecting one eye, the other being amaurotic or glaucomatous.

Treatment.—General or local remedies have no influence whatever on cataract. The only mode of removing the affection is by surgical operation.

The success of surgical operations depends in many cases on preventing the subsequent occurrence of inflammation; in none is this more important than in cataract; therefore, the alimentary canal should be in a healthy state; some days previous to the operation the patient should abstain from fermented liquors, and in certain cases from animal food also. In plethoric subjects, and such as manifest determination of blood to the head, depletion is necessary: generally it is sufficient to take some blood from the arm on the morning of the operation: free depletion is occasionally necessary even in old persons.

There are several operations performed for the relief of cataract; as *depression* or *couching*, which was the operation practised and described by Celsus: *reclination*, is a modern variation of depression: *extraction*, was introduced by Daviel, a French surgeon; more recently a third method of operating has been introduced, called the operation by *solution* or *absorption*; this is divided into *anterior* and *posterior* accordingly as the needle passes into the eye through the cornea or sclerotica.

Couching or *Depression* is performed in the following manner: the patient being seated the upper eyelid must be raised by the fingers of an assistant whilst the operator depresses the lower, or the lids may be separated by a speculum. The surgeon, holding the couching needle like a pen, passes it through the sclerotica at the external angle of the eye, about two lines posterior to the iris; the needle is pushed in until its point is dis-

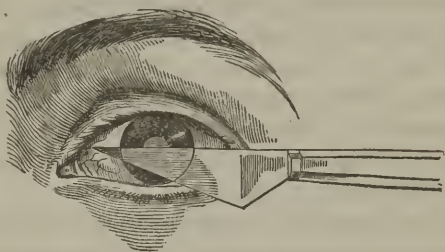


tinctly seen in the pupil anterior to the lens; the anterior capsule is then freely but cautiously opened with the point of the needle,

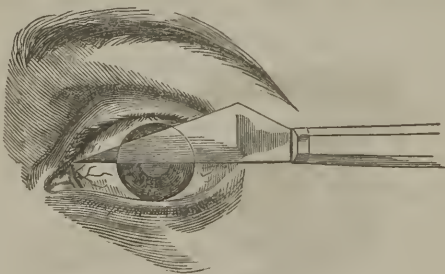
the lens must then be pressed downwards and backwards lodging it at the bottom of the vitreous humour; after a few seconds the needle is carefully withdrawn and the eyelids closed.

Reclination is performed in the same manner, except that the lens is merely reclined by pressing upon its upper edge, carrying it backwards so as to depress it sufficiently to carry it below the axis of sight.

Extraction may be performed either by making a section of the *upper* or *lower* portion of the cornea. The patient being placed as in the previous operation, the surgeon takes the cataract-knife in



the same manner as he did the needle, and directs the patient to roll the orbit towards the inner canthus, enters the knife at the external side, about a quarter or half a line anterior to the junction



of the cornea with the sclerotica, above the middle of the cornea, and pushes forward the knife, which emerges at the inner edge of the cornea, and by being carried forward cuts itself out, making

the section of the cornea. The aqueous humour is discharged; the lids should now be closed for a few moments. The next step in the operation is to separate the lids, raise the corneal flap with the curette, divide the capsule of the lens in its centre with the point of a needle; the lens gradually approaches the surface, and passes out through the corneal opening. If it remain in situ after the capsule is divided, the most gentle pressure upon the globe of the eye will suffice to dislodge it. The cornea is then adjusted, and the lids closed by a loose bandage.

Absorption or *Solution* is performed with a needle similar to the couching needle. The *anterior* operation consists in placing the patient as in the previous cases, and entering the point of the needle about a line anterior to the union of the cornea with the sclerotica, at its lower and outer part. The needle is then pushed forward through the pupil; the capsule and crystalline lens are broken up; the fragments being deposited in the aqueous humour of the eye, from which they are afterwards removed by absorption.

The *posterior* operation is distinguished from the anterior in nothing, save the fact of penetrating the eye through the sclerotica, in the same manner as directed in the operation of couching. The posterior is usually preferred to the anterior operation. Generally several weeks elapse before the remains of the capsule and lens entirely disappear. It may be necessary to repeat the operation several times before the cure can be effected. An hour or two before either of these operations is commenced, the neighbourhood of the eye should be rubbed with the extract of belladonna or stramonium, to dilate the pupil.

AMAUROSIS is an imperfection or loss of sight, which results from an affection of the nervous apparatus belonging to the eye, whether that affection be seated in the *retina*, the *optic nerve*, or the *sensorium*. It matters not if it be idiopathic or primary, sympathetic or secondary, whether it consists in vascular congestion, inflammation, or organic change, or simply in functional disturbance, it is called amaurosis.

Causes.—Amaurosis may be induced by causes acting immediately on the nervous apparatus of the eye, such as wounds or

blows inflicted upon the eye or head, excessive exertion of the organ, or exposure of the eye to vivid lights. It may arise, secondarily, from sympathy between the nervous structure of the eye and some other previously affected organ, as from irritation of the stomach, or of the nerve of the fifth pair; or it may be a symptom of affection of the sensorium more or less general. Hence the division of the complaint into *idiopathic*, *sympathetic*, and *symptomatic*. According to differences in degree and duration, it is called *incipient* or *recent*, *inveterate* or *confirmed*, *partial* or *imperfect* (*amblyopia*), and *complete amaurosis*, strictly so called, or *gutta serena*. It has been divided into *organic* and *functional*, or *dynamic*.

Diagnosis.—The distinction between amaurosis and cataract has been considered in the diagnosis of the latter disease. In perfectly uncomplicated amaurosis, the three images of a candle can always be seen; whilst in cataract the second upright and the inverted images are one or both absent, or changed in size, brilliancy, or distinctness.

The retina is affected in glaucoma, as well as in amaurosis; but in the former, other textures are also involved, and the presence of symptoms arising from this source, in addition to impaired vision, will afford the distinguishing marks of glaucoma.

Nyctalopia, night blindness, is a variety of amaurosis in which persons see distinctly during the day, but lose their sight as soon as it becomes dark.

Prognosis.—This depends upon the degree to which the vision is impaired, and the length of time the disease has existed. It is favourable or unfavourable in proportion to the injury to vision, and the recency of the attack. If the affection be partial, the case having been seen early, a complete cure may be expected; also, when amaurosis is caused by active congestion in the head, for this cause can be removed by suitable treatment.

Violent vascular disturbance may at once produce so serious a change in the retina as to render it incapable of vision, and a less degree of congestion will have the same effect, if it be long continued. The prognosis is unfavourable when the complaint has been preceded and is accompanied with severe pains in the brow,

temple, and head; by pains either not relieved by treatment, or if relieved, quickly returning; also, when attended with similar pain of the eye, or when the case is accompanied with epileptic symptoms, paralytic affections, or great changes in the pupil. Under such circumstances, organic changes in the retina, optic nerve, orbit, skull, or brain, may reasonably be suspected.

Cases of total insensibility, or near approximation to it, become hopeless after the lapse of a few weeks without relief. Amaurosis attendant on confirmed hydrocephalus, as well as congenital cases, are hopeless.

Treatment.—This should be *antiphlogistic*, consisting in general and local bloodletting, particularly the latter, by cupping and leeching the temples and back of the neck, active purgation and low diet. The patient should be brought promptly under the influence of *mercury*. In the more acute cases, this remedy must be employed freely. It should sometimes be carried to the extent of ptyalism. Its use must be continued for several weeks, in order to insure all the benefit it is capable of conferring.

Counter-irritation is a valuable auxiliary in the treatment of amaurosis. Blisters may be applied, with benefit, to the nape of the neck, behind the ears, and the temporal and frontal regions, successively, a fresh application being made every five, six, or seven days.

If these means fail, little can be effected by any mode of treatment. The patient should be directed to live in a way most conducive to general health, as residence in pure air, exercise, a plain but nutritious diet, the use of mild aperients, and repose of the affected organ. The treatment must be graduated according to the violence of the attack, the constitution, age, the strength of the patient, and numerous other circumstances. All amaurotic patients do not require bleeding and salivation.

Strychnia has been highly recommended in amaurosis where there is atony, or simple want of power.

HORDEOLUM, or **STYE**, is an inflamed tumour, involving one or more of the Meibomian glands. The inflammation is generally attended with the formation of a small slough, being a boil in miniature.

Treatment.—This affection rarely requires any treatment. It may, however, be so painful or inflammatory as to require interference. A mild poultice to the eye, or tepid washes, may hurry suppuration; and when the slough is slow at coming away, the tumour may be punctured. When the inflammation has subsided, and the tumour become indolent, the application of nitrate of silver or nitric acid diluted, will frequently effect a speedy cure. Leeching and purgation may become necessary when the inflammation runs high.

ENCYSTED TUMOURS OF THE EYELIDS.—Steatomatous and melicerous tumours, from the size of a pea to that of a large bean, are frequently met with beneath the conjunctiva, or in the substance of the eyelid. They are generally soft, devoid of pain, and roll under the finger. When the tumour attains a very large size, it is liable to interfere with vision, or produce eversion and other diseases of the eyelids.

Treatment.—Extirpation is the only remedy. When the tumour is immediately beneath the conjunctiva, it must be removed by incision from the inner side of the lid; but when it is deeply seated in the substance of the orbicular muscle, or lies exterior to it, it should be extirpated by cutting through the lid from the outer side. The incision should be made parallel with the edge of the eyelid, the tumour seized by a hook, and removed by a few touches of a scalpel; the wound, if external, must be brought together, and simply dressed; if the incision be upon the conjunctival surface, no dressing is required, save a piece of linen wet with cold water applied to the eye.

ENTROPION.—*Entropium*, or *inversion* of the eyelids, may be either temporary or permanent, partial or complete.

Temporary inversion, particularly of the lower lid, may occur in chronic external ophthalmia, and sometimes in more acute cases.

Permanent entropium is generally met with in the upper lid: it arises mostly from protracted ophthalmia, or psorophthalmia.

Treatment.—The morbid condition of the conjunctiva must be removed.

Temporary inversion rarely lasts over twelve or twenty-four

hours, and may be readily relieved by fastening one end of a strip of adhesive plaster to the inverted eyelid, and the other to some part of the face, so that sufficient traction may be exerted to remedy the deformity.

Permanent entropion is not so easily remedied: for this several operations have been practised. The operation mostly employed is the removal of an elliptical piece of the skin of the eyelid. The skin is taken up between the blades of forceps, so as to judge of the extent necessary for the correction of the deformity; this is removed by a knife or scissors, and the edges brought together by two or three interrupted or twisted sutures; the incision should be as near as possible to the ciliary margin, just leaving room for the sutures, which may be cut out in about twenty-four hours after their insertion. A vertical incision about three lines in length, near one or both angles of the inverted lid, often adds much to the good effects of the operation.

If the entropion be again produced, other means must be resorted to.

Mr. Tyrrell makes a perpendicular section of the whole substance of the lid near its centre, which in some cases is followed by a rapid removal of the inversion, while in other instances it is necessary in addition to cut out a portion of integument. The section of the lid makes a wound like the letter V, which is afterwards filled by granulations, so that little deformity results. The operation of Professor Jaeger of Vienna is a very effectual mode of removing this disease. In a case of complete inversion it is difficult, if not impossible, to accomplish a perfect cure, that is, to restore the edge of the lid with its lashes to its natural state; the excision of the bulbs sacrifices the lashes, but has the advantage of removing effectually all source of irritation from the eye. A smooth slightly concave piece of horn, adapted to the size of the lid, is introduced under it as a means of extension and support in the operation; this, however, is not indispensable: a horizontal incision is then carried through the skin and orbicularis muscle, a line and a half from the ciliary margin, and carried to each extremity of the inverted portion. The part thus marked out is to be dissected carefully off by repeated short strokes

of the knife carried obliquely, so as to include the bulbs of the inverted lashes, and leave the mucous surface entire. As the integument is usually redundant, it may sometimes be advantageous to make the first incision farther from the margin of the lid; but in the subsequent dissection there should not be more than a line and a half removed, which will include the ciliary bulbs. The portion to be removed may be drawn and held outwards with forceps, or by means of a ligature passed under the skin. The eye should be dressed with a piece of linen or lint kept wet with cold water.

Dr. Jacob, of Dublin, cuts away the cilia and their bulbs with scissors, making repeated small incisious until the whole of the inverted portion is removed.

TRICHIASIS denotes an unnatural direction of the cilia, in which they turn inwards so as to press against the eyeball.

Treatment.—The *palliative* treatment consists in plucking out the cilia with forceps. The lashes soon grow again, and must be extracted as often as they are reproduced.

The *radical* cure consists in the extirpation of the bulbs of the inverted cilia, after the manner described for entropium.

ECTROPIUM, OR EVERSION, signifies turning the lids outwards. It is more frequent in the lower than in the upper lid, and may be either *temporary* or *permanent*.

Temporary ectropium occurs in some inflammations, particularly in the purulent, and is most frequent in the purulent ophthalmia of infants.

Permanent eversion may arise from the same causes which produce inversion. Occasionally it arises from burns and wounds.

The exposure of the mucous membrane to the air and other sources of irritation increases the inflammation and thickening, until it degenerates at last into a red swelling, more or less considerable, the surface of which assumes ultimately a smooth cuticular aspect near the edge of the lid; the case is then called fleshy ectropium, *ectropium sarcomatosum*.

Treatment.—Ectropium, even when accompanied with much thickening of the conjunctiva, may be remedied by the free application of red precipitate ointment, or by being touched lightly with

the nitrate of silver: they should be applied to the everted and thickened surface, as well as to the ciliary margin of the lid: the shrinking thus produced on the internal surface draws the edge of the lid into its natural situation. If the sarcomatous growth of the conjunctiva should be too considerable to be reduced by the means just specified, it will be necessary to shave off the thickened membrane, and the contraction produced by the cicatrization of the surface will draw the edge of the lid into its proper position.

When the eversion is considerable and of long standing, the tarsus becomes elongated and changed in figure, so that it is no longer adapted to the convexity of the globe. This being the case, it may be brought to the proper length by removing a portion of the lid, shaped like the letter V, either by the knife or scissors, and the wound united with the twisted or interrupted suture, which should be removed at the end of twenty-four or forty-eight hours.

Dr. Jaeger's operation consists in passing a sharp-pointed double-edged knife through the conjunctival surface, near the inner angle of the eye, and bringing it out through the skin on the cheek; it must then be carried on transversely to the outer angle: the detached lid must now be fixed accurately and firmly in contact with the globe, whilst the integuments of the cheek must be drawn up towards the eye, and maintained in that position by adhesive straps, compresses, and bandages. An analogous proceeding is applicable in the upper lid.

Professor Dieffenbach performs the following operation for the removal of this deformity. He makes an incision through the skin and orbicularis muscle, nearly parallel to the edge of the lower lid, beginning two or three lines from one angle and ending at the same distance from the other, the incision being one line from the edge of the lid at its two ends, and two or three lines in the middle; he turns up the small flap of skin thus made, dissecting through the lid to the conjunctiva, which he divides to the extent of the external wound; with forceps he then draws the external edge of the divided conjunctiva into the wound in the integuments, and unites the lips of the wound by sutures, which pass through the conjunctiva as well as the skin: force is thus applied to the ciliary margin of the everted lid, which draws it into position.

PTOSIS.—*Ptoſis*, *Blepharo-ptosis*, or *Lapsus palpebræ superioris*.—By these names is designated falling of the upper eyelid, accompanied with a partial or complete want of power to elevate it. Such a state may exist for a time with enlargement of the part in consequence of inflammation or injury: it gradually disappears without any local treatment.

The name *ptosis* is sometimes applied to the falling of the lid, consequent on paralysis of its levator muscle, the *ophthalmoplegia* of some authors. If the eyelid be lifted, it slowly falls down again over the eye, and the patient either is unable to move it by voluntary exertion, or can raise it only partially.

This affection must be treated as paralysis consequent on disease of the brain; that is, by abstraction of blood, aperients, low diet and the administration of mercury.

FISTULA LACRYMALIS.—*Permanent obstruction of the nasal duct* may take place as a consequence either of acute or chronic inflammation, or it may be produced by extension of disease from the nose: it occurs occasionally in the latter way in strumous children: inflammation beginning in the Schneiderian membrane, creeps on to the lining of the sac.

Obstruction of the duct may arise from syphilitic diseases of the nose; from caries or exostosis of the surrounding bone, and from morbid growths of various kinds, originating in the nose or antrum. Inflammation of the sac and obstruction of the nasal duct are occasional consequences of small-pox in children.

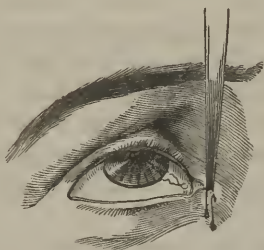
If permanent obstruction of the duct causes repeated inflammations of the sac and eye, and they cannot be prevented or removed by the means already pointed out, we must resort to other measures for restoring the passage of the tears into the nose.

Treatment.—Various means have been proposed for removing obstruction of the nasal duct: they are usually mentioned as operations for fistula lacrymalis, although in the majority of instances, there is no fistulous opening.

Before performing any operation, we should ascertain positively that there is a permanent obstruction which cannot be removed by other means. If inflammation of the sac be treated on proper principles, the cases requiring operations will be very few. We

should avoid the operation as long as we can, because it is but a temporary and imperfect remedy: if the obstruction be merely cleared away it will probably soon recur. To avoid this the patient must submit to the inconvenience of wearing a foreign body in the duct to maintain it in a pervious state.

The operation for obstruction of the nasal duct consists in passing a narrow bistoury into the duct, introducing its point just below the tendon of the orbicularis palpebrarum, and by pressing downwards, backwards, and inwards, it enters the duct; the remaining



obstruction of the duct must be cleared by adequate pressure with a probe: a catgut or silver style is introduced about the thickness of an ordinary probe, an inch and a quarter in length, with an expanded head to prevent it sinking into the wound, or long enough to reach from the corner of the eye, to the termination of the nasal duct: a piece of bougie is sometimes placed in the duct for a week or ten days, injecting the passage frequently with tepid water. The patient soon learns to remove and replace the style, which becomes quite loose: he should be directed to take it out and clean it from time to time. As the presence of the instrument causes neither pain nor inconvenience, it should be worn permanently, since this method maintains the natural course of the tears with the least trouble to the patient.

FOREIGN BODIES IN THE EYE.—Foreign bodies of various kinds often get under the eyelids, or stick into or pass through the cornea. Thus, small pieces of steel and hot iron often strike into the surface of the cornea, producing considerable irritation, and sometimes active inflammation. Lime, if pure, is very destructive to the

cornea, turning it white and destroying its transparency, as well as creating violent inflammation of the conjunctiva.

Treatment.—Washes are of very little use in removing foreign substances from the eye; therefore close inspection should be made, and the foreign body removed by forceps, the point of a needle, or the knife, as the case may be. When glass or other matter penetrates the cornea deeply, it may be necessary to make a section of the cornea with a cataract knife, to remove the foreign body. Small specks of hot iron adhere so tightly to the surface of the cornea, that nothing but the point of a couching knife or needle will remove them. Other substances sticking in the eye, or placed under the lids, can only be removed with facility by forceps. Light substances upon the surface may be brushed off by a camel's hair pencil. Foreign bodies should always be removed from the orbit, except where it is a small substance lodged in the aqueous humour, which does not produce much irritation, and there is a prospect of its absorption.

Subsequent inflammation must be treated according to the principles heretofore laid down.

MYOSIS is a name given to unnatural contraction of the pupil. This is a frequent consequence of iritis. In some instances the imperfection of vision may be remedied or alleviated by the use of belladonna.

MYDRIASIS denotes the opposite of myosis, or a preternaturally dilated condition of the pupil. Most frequently this is a symptom of amaurosis, consequent on disease of the retina. As a temporary state, it is produced by the external application or internal use of certain narcotics.

This condition may sometimes be removed by dropping into the eye a collyrium of acetate of strychnia.

EPICANTHUS consists in a fold of skin projecting in such a way from the side of the root of the nose, over the inner angle of the eye, as to cover the caruncula lacrymalis and inner portion of the globe of the eye.

Treatment.—This state, when it interferes with vision, must be remedied by pinching up a fold of the skin, sufficient to correct the deformity, and removing it by the knife or scissors, bringing the edges of the wound together by the hare-lip suture.

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ERRATA.

Page 411, line fourteenth. For "acetum cantharides, and aqua ammonia," read "acetum cantharidis, and aqua ammoniæ."

Page 413. For "fungus articuli, or white swelling," read "fungus articuli."



